

COMPUTERFACTS®

Technical Service Data

STAR® MODEL NR-10(VERSIONS 1,2,3) PRINTER



FEATURES • COMPLETE SCHEMATICS • PRELIMINARY SERVICE CHECKS • TROUBLESHOOTING TIPS •
EASY-READ WAVEFORMS • REPLACEMENT PARTS LISTS • SEMICONDUCTOR CROSS-REFERENCE

PRELIMINARY SERVICE CHECKS

This data provides the user with a time-saving service tool which is designed for quick isolation and repair of Printer malfunctions.

Check all interconnecting cables for good connection and correct hook-up before making service checks.

Always turn Printer Off before connecting or disconnecting connectors, boards or Computer.

Replacement or repair of the Fuse Board, Control Board, Control Panel Board or connectors may be necessary after malfunctions have been isolated.

TEST EQUIPMENT

Digital Volt/Ohm Meter
Logic Probe

TOOLS

Print Head Cleaning Equipment
Contact and Switch Cleaner (non-spray type)
Phillips Screwdriver
Low Wattage Soldering Iron
Desoldering Equipment

REPLACEMENT PARTS AND DESCRIPTION

	Control Board
	Control Panel Board
	Fuse Board
CM1	Carriage Motor
DB1	Bridge Rectifier
DB2	Bridge Rectifier
F1	Fuse 4A 125V AC (Fuse Board)
F2	Fuse 5A 125V AC (Main Board)
F1,3,4,5	Fuse 3A 125V DC (Main Board)
IC1	Voltage Regulator (5V)
LF1	Paper Feed Motor
M1	Home Position Sensor
M2	Paper End Sensor
M3	Release Lever Switch
M4	Automatic Sheet Feeder Switch
PH1	Print Head
SW1	Power Switch
T1	Power Transformer
TR1	Voltage Regulator 3.6V
TR2	Voltage Regulator 39V
XTAL1	14MHz Crystal

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MODEL NR-10(VERSIONS 1,2,3)
CP67

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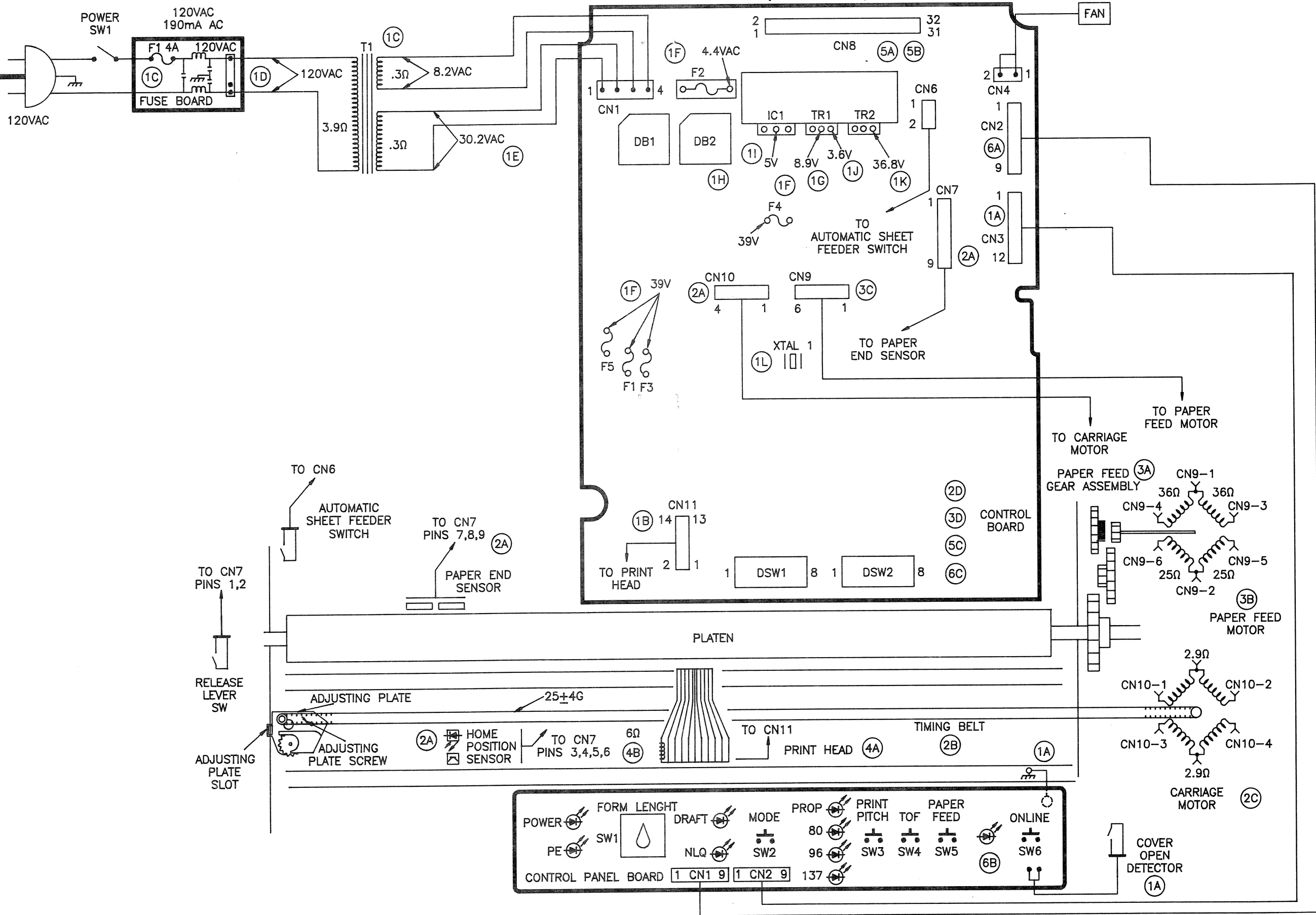
The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co. as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co. by the manufacturers of the particular type of replacement part listed. **90CP19104 DATE 2-90**

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PRELIMINARY SERVICE CHECKS (Continued)



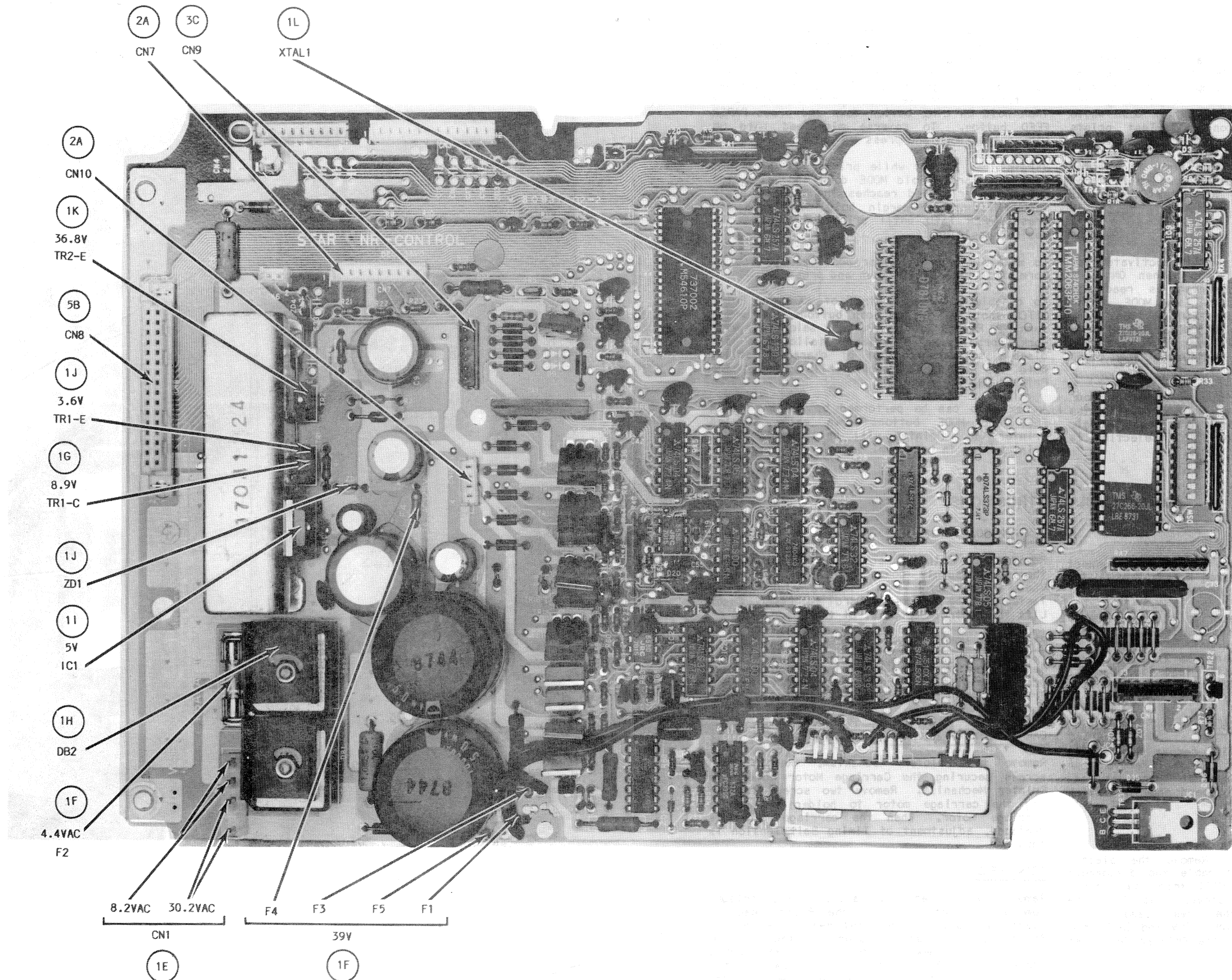
INTERCONNECTING DIAGRAM

INTERCONNECTING DIAGRAM

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PRELIMINARY SERVICE CHECKS (Continued)



CONTROL BOARD

X

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CONTROL BOARD

III

PRELIMINARY SERVICE CHECKS (Continued)

GENERAL OPERATING INSTRUCTIONS

PRINTER SELF-TEST

Printer has a short and a long Self-Test. Short Self-Test prints six lines of 80-column text in Draft mode, then stops. Short test is started by loading paper and closing the cover, then holding ON LINE button down while turning Printer On. Long Self-Test prints 80-column text in Draft and Near Letter Quality modes in both Standard Roman characters and Italic characters. The long test is started by holding PAPER FEED button down while turning Printer On. The long test continues printing until Printer is turned Off.

PANEL CONTROLS

Cover and Paper switches must be activated for the printer to go ON LINE. When ON LINE Indicator LED is On, Printer is ready to receive data from Computer. The MODE, PRINT PITCH, TOF, and PAPER FEED buttons are disabled when Printer is ON LINE. Pressing ON LINE button once stops Printer from receiving data from Computer and activates the other buttons.

Each time MODE button is pressed print mode changes between DRAFT and NLQ. Pressing the PRINT PITCH button cycles thru Proportional, 80, 96 and 136. MODE and PITCH selection is indicated by Control Panel LEDs.

Pressing PAPER FEED button advances paper one line. Pressing TOF button advances paper to top of next page or form (Form Feed). Printer has a forward and reverse microfeed function to help in aligning the print start position. To forward microfeed, put Printer Off Line then hold ON LINE button down and press PAPER FEED button. To reverse microfeed hold ON LINE button down and press TOF button.

Margins can be set while printer is OFF LINE. For left margin hold MODE down and press TOF until the printhead reaches the desired position. For right margin hold MODE down and press PAPER FEED until printhead reaches the desired position.

To make the current paper position the Top of Form, hold PRINT PITCH down and press TOF.

To disable software control of MODE and PRINT PITCH, hold either or both buttons down while turning Printer On. Button selection will work normally. To select Italic mode and disable software control of character style, hold the TOF button down while turning the Printer On.

A hex dump can be performed by holding PAPER FEED and MODE buttons down while turning Printer On. Printer will print contents of print buffer in hex form.

DISASSEMBLY INSTRUCTIONS

UPPER CASE UNIT REMOVAL

Remove Paper and Printer ribbon. Disconnect power and remove the Platen Knob. Remove the Interface cover, and remove the Parallel Interface Board by pulling it straight up. Remove the two screws securing the Upper Case. Lift the back of the Upper Case slightly and push it towards the front of printer to separate the tabs of Upper Case from the Lower Case. Disconnect chassis lead to Control Panel and Connectors (CN2 and CN3). Remove the Upper Case.

CONTROL PANEL BOARD REMOVAL

Remove the Upper Case unit, remove the tapping screw securing the Cover Switch. Remove four screws securing the control panel board. Remove the Control Panel Board and the switch out of the Upper Case unit.

PRINTER MECHANISM REMOVAL

Remove the Upper Case. Remove the plastic door covering the ribbon cable and disconnect the print Head Cable (CN11) from the Control Board. Remove four screws securing the Printer Mechanism to the Lower Case. Disconnect Connectors CN6, CN7, CN9 and CN10 from the Control Board. Lift the Printer Mechanism out of Lower Case.

CONTROL BOARD REMOVAL

Remove the Printer Mechanism and disconnect the power supply connector CN1. Disconnect the Fan connector CN4. Remove eight screws fastening the Control Board to Lower Case. Lift the Control Board out of the Lower Case.

PAPER FEED MOTOR REMOVAL

Remove the Printer Mechanism. Remove two screws holding the Paper Feed Motor to the Printer Mechanism. Remove the Paper Feed Motor.

CARRIAGE MOTOR REMOVAL

Remove the Printer Mechanism. Remove four screws securing the Carriage Motor Holder to Printer Mechanism. Remove two screws fastening the carriage motor to holder and remove carriage motor. When the carriage motor is replaced, adjustment of Timing Belt Tension is required.

PRINT HEAD

Remove the Printer Cover and ribbon cartridge. Remove the hook holding the Print Head in place and pull up the Print Head. Remove the Print Head Connector Cover mounted to the frame, then remove the Print Head Cable connected to CN11 on the Control Board. When a new Print Head is installed, perform the Print Head Gap Adjustment.

PRELIMINARY SERVICE CHECKS (Continued)

MISCELLANEOUS ADJUSTMENTS

PRINT HEAD GAP

Set Adjustment Lever to position 1. Measure gap between Platen and Ribbon Guide with Carriage Assembly at center, left end, and at right end. All three measurements should be 0.20mm to 0.25mm. See Figure A. If any measurement is out of tolerance, loosen Adjustment Lever Nut. Insert a small rod into hole at left end of Rear Carriage Shaft, see Figure B. To adjust right end gap, rotate Rear Carriage Shaft, with rod, until proper gap measurement is obtained. To adjust center and left end gap, hold Rear Carriage Shaft in position with rod, and rotate Left Adjustment Bushing until proper gap measurement is obtained. After adjustment is complete, tighten Adjustment Lever Nut, while ensuring that Left Adjustment Bushing and Rear Carriage Shaft do not move.

FIGURE A

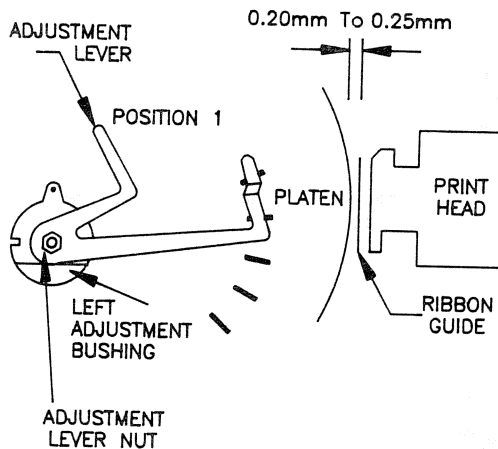
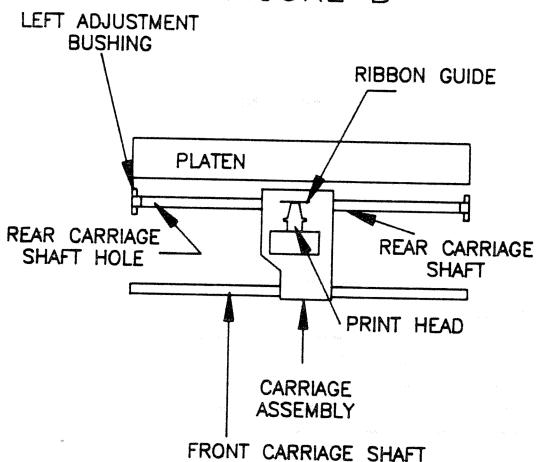


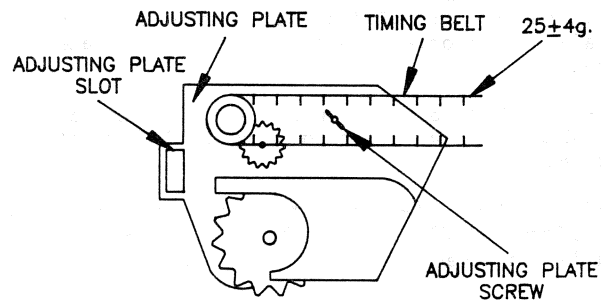
FIGURE B



TIMING BELT TENSION

Set Adjustment lever to position 1, see Figure A. Position Carriage Assembly to right end. Check Timing Belt Tension for $25 \pm 4g$ ($3/4$ to 1 oz) to deflect the back length of the timing belt $5/64$ " to the front, measured 5 inches to the right of the center of the Timing Pulley. If measurement is not correct, loosen screw securing Adjusting Plate, see Figure C. Insert a common screwdriver into slot on Adjusting Plate and adjust until proper Timing Belt tension is obtained. Tighten adjusting Plate Screw.

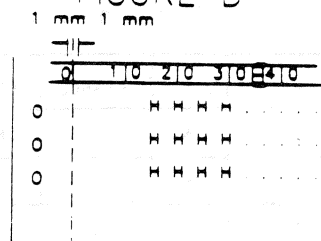
FIGURE C



HOME POSITION DETECTOR

Initiate Printer Self Test. Left margin should be in line with "0" on Ball Roller Scale $\pm 1mm$. If left margin is out of position, loosen Home Position Detector Screw. Reposition Home Position Detector so left margin is properly positioned, see Figure D. Tighten Home Position Detector Screw.

FIGURE D



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PRELIMINARY SERVICE CHECKS (Continued)

SWITCHES AND JUMPERS

DIP SWITCH SETTINGS

"Caution": Do not change the Dip Switch setting when the printer or connected computer power is "ON".

DSW1-1 If "ON" the printer will stop printing when it runs out of paper. If "OFF" this switch disables the paper out detector.

DSW1-2 If "ON" the SELECT IN signal of the parallel interface is held low. If "OFF" the SELECT IN signal is controlled by host computer (when High, printer cannot accept data).

DSW1-3 If "ON" the down load character definitions are ignored and the RAM is used as a print buffer. If "OFF" the down load character definitions are enabled and the buffer is reduced to one line.

DSW1-4 If "ON" the default line spacing is set to 1/6 inch. If "OFF" the default line spacing is set to 1/8 inch.

DSW1-5 If "ON" Line Feed is required from the host computer. If "OFF" one Line Feed is automatically performed with every carriage return.

DSW1-6 If "ON" bottom margin is not set at Power On. If "OFF" bottom margin is set to one inch.

DSW1-7 If "ON" the default pitch is normal Pica pitch (10CPI). If "OFF" the default pitch is condensed Pica pitch (17CPI).

DSW1-8 If "ON" the zeros will be printed without slashes. If "OFF" the printer will print slashed zeros.

DIP SWITCH 2

DSW2-1 If "ON" the default character style is normal draft. If "OFF" the default character style is set to Near Letter Quality.

DSW2-2 If "ON" the printer emulates the Epson FX-85 printer (Standard). If "OFF" the printer uses the "IBM" compatible mode.

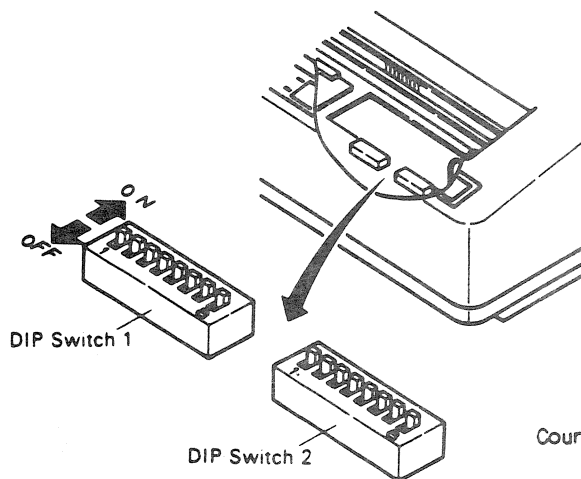
DSW2-3 If "ON" and DSW2-2 is "OFF", the printer emulates IBM-P (Proprietary). If "OFF" and DSW2-2 is "OFF", the printer emulates IBM-G (Graphic printer).

DSW2-4 This switch function depends on the setting of Switch DSW2-2. If DSW2-2 "ON": DSW2-4 "ON" sets MINIMUM line feed value to 1/216 inch, DSW2-4 OFF sets MINIMUM line feed value to 1/144 inch.

If DSW2-2 is OFF: DSW2-4 "ON" selects Character Set #1, OFF selects Character Set #2.

DSW2-5 If "ON" the print head will return to the left margin after the paper advance. If "OFF" the print head will not return to the left margin after the paper advance.

DSW2-6 thru 2-8 will select the default International character set. See Chart.



Courtesy of Manufacturer

The DIP Switches are located under the Printer Cover

International Character Sets

SWITCH	USA	FRANCE	GERMANY	ENGLAND	DENMARK	SWEDEN	ITALY	SPAIN
2-6	ON	OFF	ON	OFF	ON	OFF	ON	OFF
2-7	ON	ON	OFF	OFF	ON	ON	OFF	OFF
2-8	ON	ON	ON	ON	OFF	OFF	OFF	OFF

PRELIMINARY SERVICE CHECKS (Continued)

SERVICE CHECKS

MATCH THE NUMBERS ON THE INTERCONNECTING DIAGRAM AND PHOTOS WITH THE NUMBERS ON THE SERVICE CHECKS TO BE PERFORMED.

① PRINTER DEAD

- (A) Verify connection of chassis slip connector to pin on Control Panel Board. Check Cover Open Detector switch (SW8) for closed continuity, and Control Board connector CN3, pin 11 for ground when SW8 is closed.
- (B) CAUTION: If printer is still turned on, Printhead may be hot. Turn off printer and disconnect printhead cable from Control Board. Secure printhead cable to carriage and start printer self test. If carriage travels as it should in self test, check Printhead by substitution.
- (C) Check AC Fuse on Fuse board. If open check Power Transformer (T1) for possible short.
- (D) If AC Fuse is good, check for 120VAC between pins of Transformer Connector on Fuse Board. If voltage is missing, check Fuse Board by substitution.
- (E) Check for 30.2VAC between pins 1 and 2 and 5.2VAC between pins 3 and 4 of connector CN1. If either voltage is missing, check Power Transformer (T1) by substitution.
- (F) Check for 39V at both ends of Fuses (F1,F3,F4,F5) and 4.4VAC at Fuse (F2) on the Control Board.
- (G) Check for 8.9V at the collector of Regulator Transistor (TR1).
- (H) If 8.9V is missing check Diode Bridge (DB2).
- (I) Check for 5V at the output of IC1. If 5V is missing check IC1 by substitution.
- (J) Check for 3.6V at the emitter of Regulator (TR1). If 3.6V is missing, check transistor TR1 and Zener Diode (ZD1) by substitution.
- (K) Check for 36.8V at the emitter of TR2.
- (L) Check for pulses at pins of XTAL1. If pulses are missing check XTAL1 by substitution.

② CARRIAGE ASSEMBLY DOES NOT OPERATE

- (A) If carriage assembly moves, then stops and alarm buzzer sounds, check connectors CN10 and CN7. Check voltage at CN7 Pin 8 for over 1V with paper loaded and under .2V with no paper. Check CN7 Pin 5 for over .5V when the Home Position Sensor (M1) is clear and under .25V when the sensor is blocked.
- (B) Check the timing belt.
- (C) Check Carriage Motor winding resistances. Check the motor by substitution.
- (D) Check Control Board by substitution.

③ PAPER FEED MOTOR MALFUNCTIONING

- (A) Check Paper Feed Gear Assembly.
- (B) Check Paper Feed Motor.
- (C) Check Connector CN9.
- (D) Check Control Board by substitution.

④ PRINT HEAD MALFUNCTIONING

- (A) Check Print Head for damage or contamination.
- (B) Check the resistance of Print Head solenoids.

WARNING: Shorted Driver can damage Print Head. Check Drivers for short before replacing the Print Head.

⑤ PRINTER WILL NOT RECEIVE DATA

- (A) Check Interface Board and cable.
- (B) Check connector CN8 on Main Board.
- (C) Check Control Board by substitution.

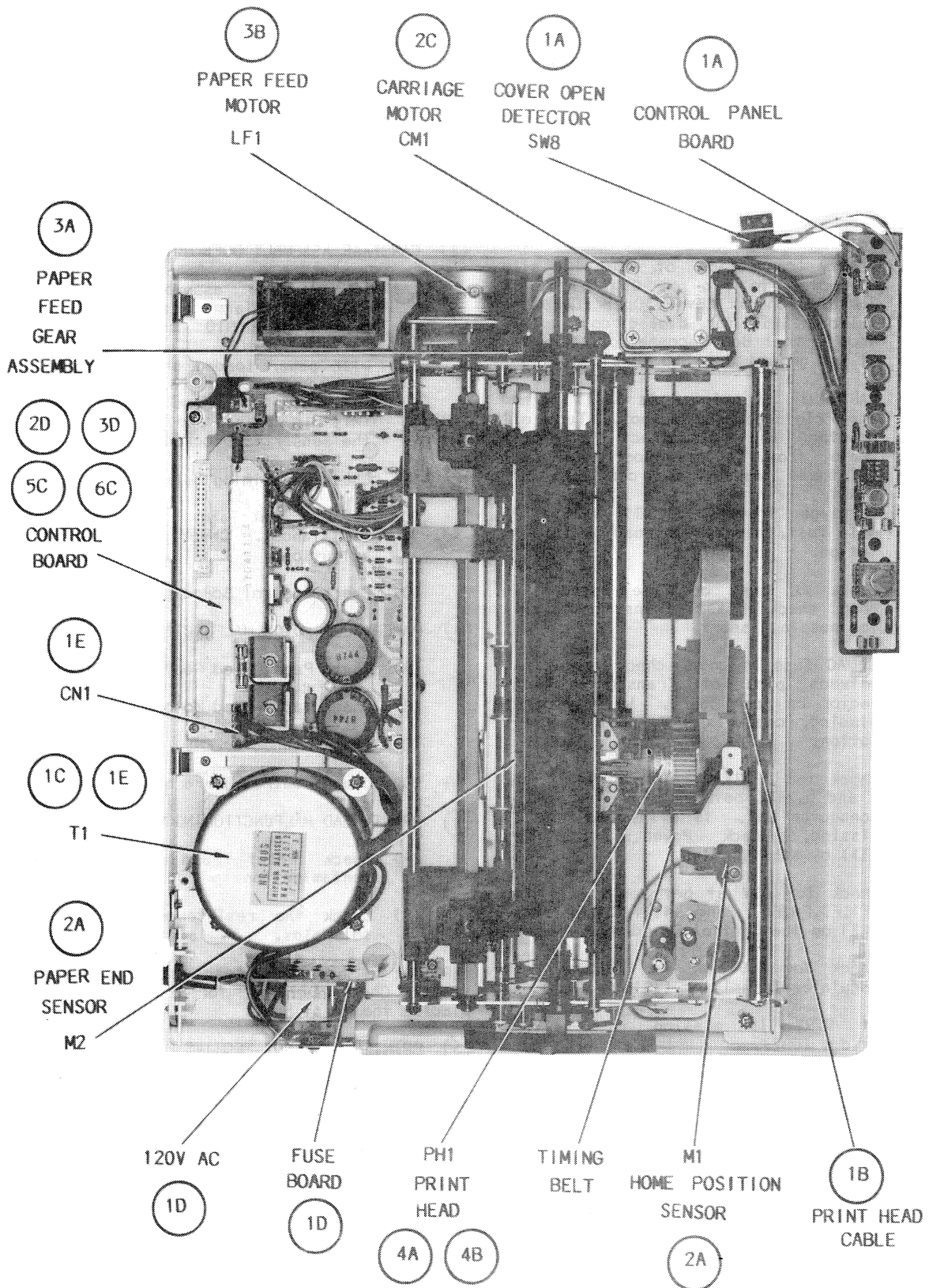
⑥ CONTROL PANEL MALFUNCTIONS

- (A) Check connectors CN2 and CN3 on Control Board.
- (B) Check Control Panel Board by substitution.
- (C) Check Control Board by substitution.

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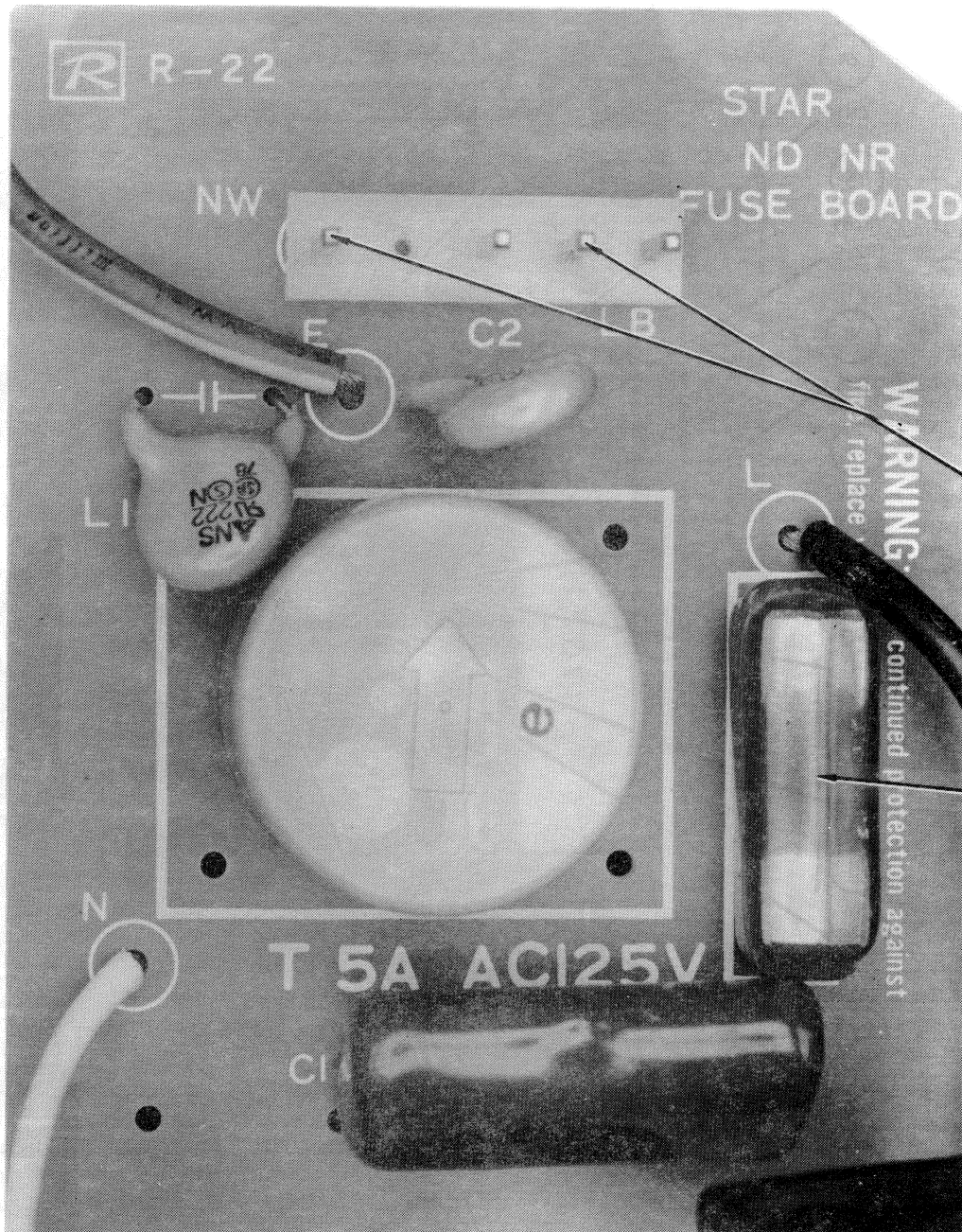
PRELIMINARY SERVICE CHECKS (Continued)



CHASSIS-OVERALL VIEW

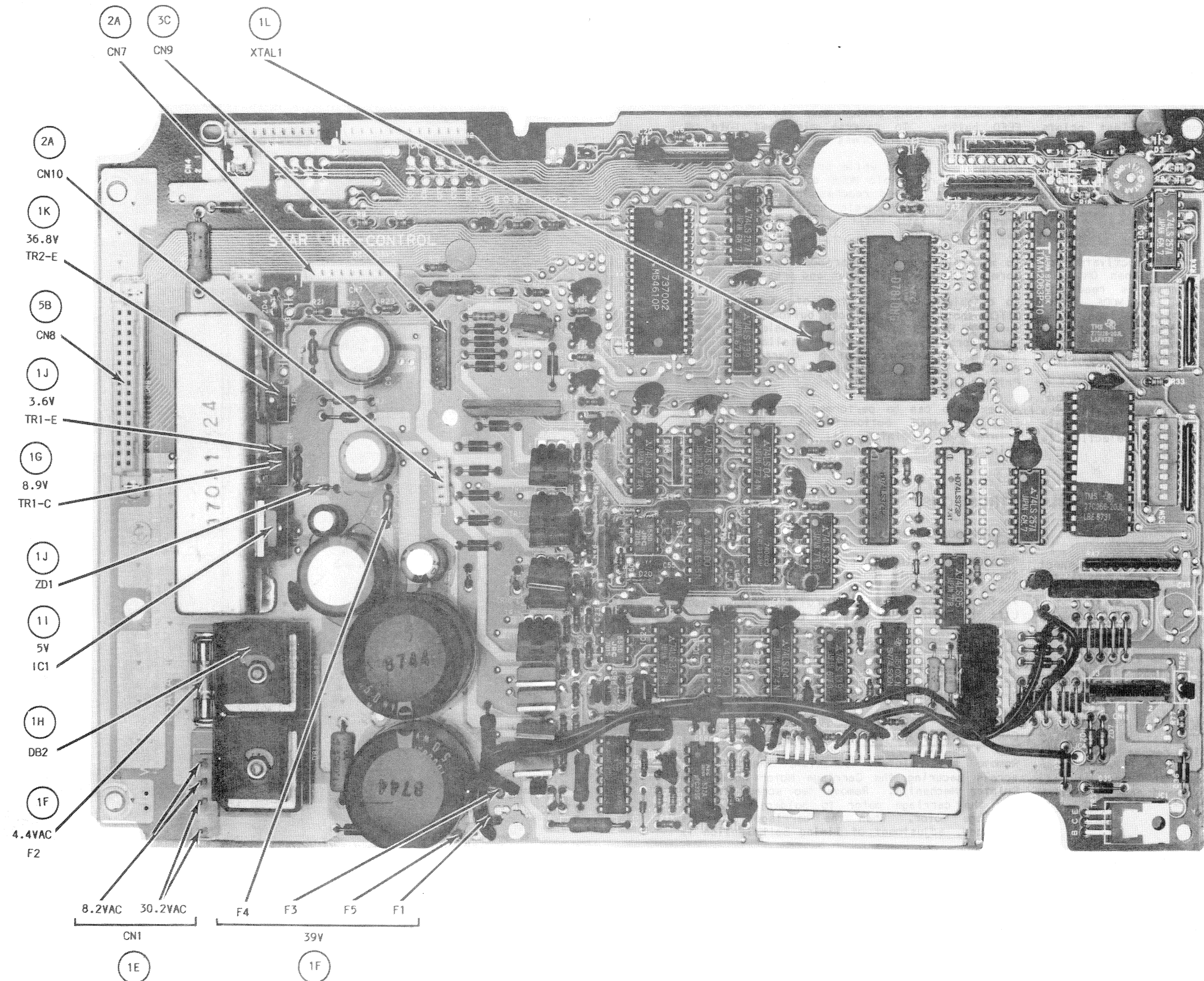
PRELIMINARY SERVICE CHECKS (Continued)

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FUSE BOARD

PRELIMINARY SERVICE CHECKS (Continued)



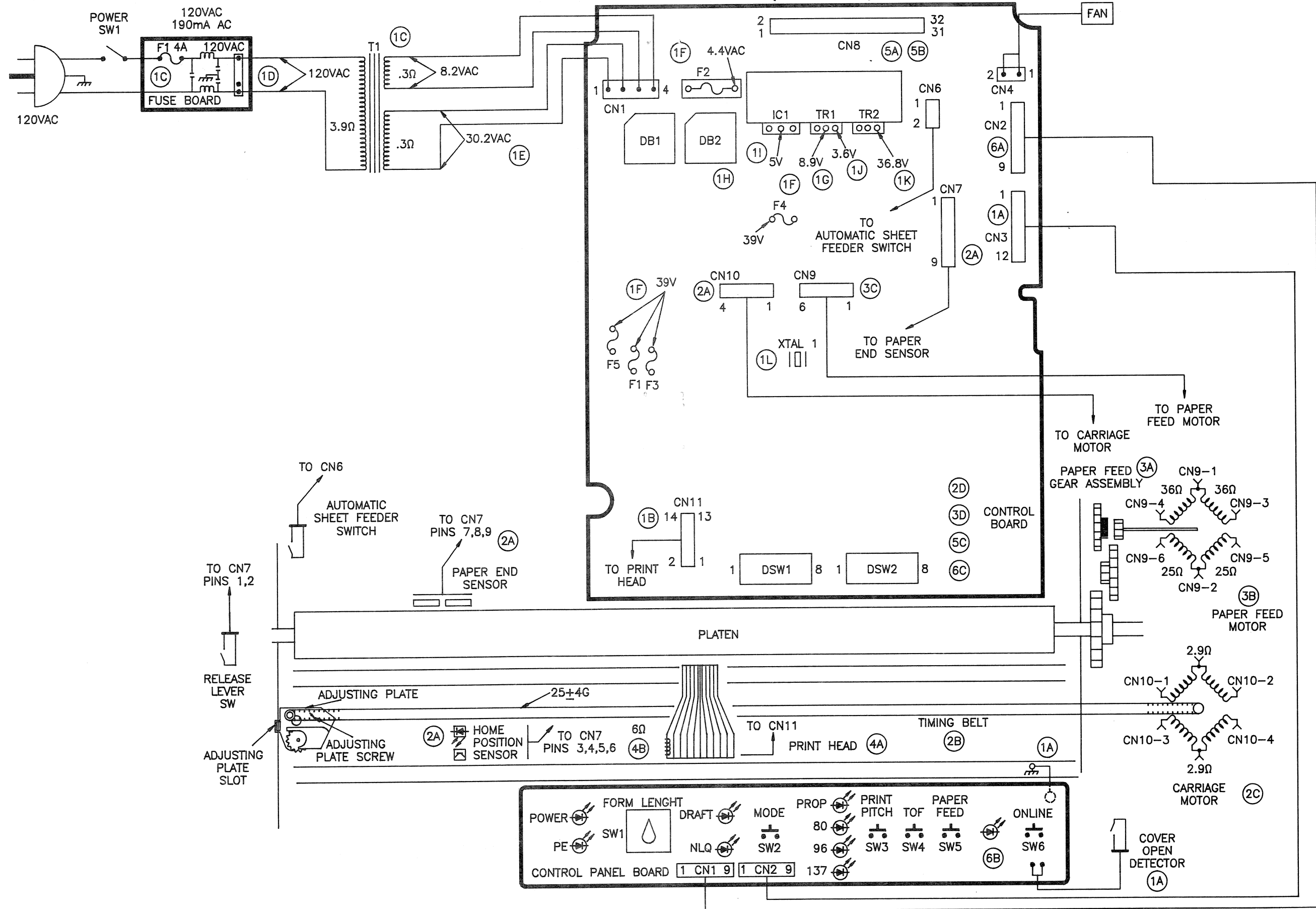
CONTROL BOARD

X

CONTROL BOARD

III

PRELIMINARY SERVICE CHECKS (Continued)



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PRELIMINARY SERVICE CHECKS (Continued)

PREVENTATIVE MAINTENANCE

ENVIRONMENT

Computers perform best in a clean, cool area that is below 80 degrees Fahrenheit and free of dust and smoke particles. Even though home Computers are not affected by cigarette smoke as much as commercial Computers are affected, it is better to maintain a smoke-free area around the Computer. Do not block cabinet vents of Computer, Monitor, Printer, or other power devices.

ELECTRICAL POWER

Variations in the line voltage can affect the Computer. Try to avoid these fluctuations by using an AC receptacle that is on a power line not used by appliances or other heavy current demand devices. A power-surge protector, power-line conditioner, or non-interruptible power supply may be needed to cure the problem. **Do not** switch power On and Off frequently.

KEYBOARD

Liquids spilled into the Keyboard can ruin it. Immediately after a spill occurs, disconnect the Computer power plug from AC power outlet. Then, if circuitry or contacts are contaminated, disassemble the Keyboard and carefully rinse the Keyboard printed circuit board with distilled water and let it dry. Use a cotton swab to clean between the keys. Use a non-abrasive contact cleaner and lint-free wipers on accessible connectors and contacts.

DISK DRIVES

Clean the read/write heads of the Disk Drives about once a month or after 100 hours usage. Use only an approved head cleaning kit.

Handle carefully to preserve proper disk head alignment. A sudden bump or jolt to the Disk Drives can knock the disk head out of alignment. If Disk Drive must be transported, place an old disk in slot and close door during transport.

Store disks in their protective covers and never touch the disk surface. Observe the disk handling precautions usually found on the back of disk protective covers.

PRINTERS

Carefully vacuum the Printer regularly. Wipe surface areas clean using a light all-purpose cleaner. Do not oil the machine. The oil will collect abrasive grit and dust. The dust will act as a blanket. This can cause components to overheat and fail.

STATIC ELECTRICITY

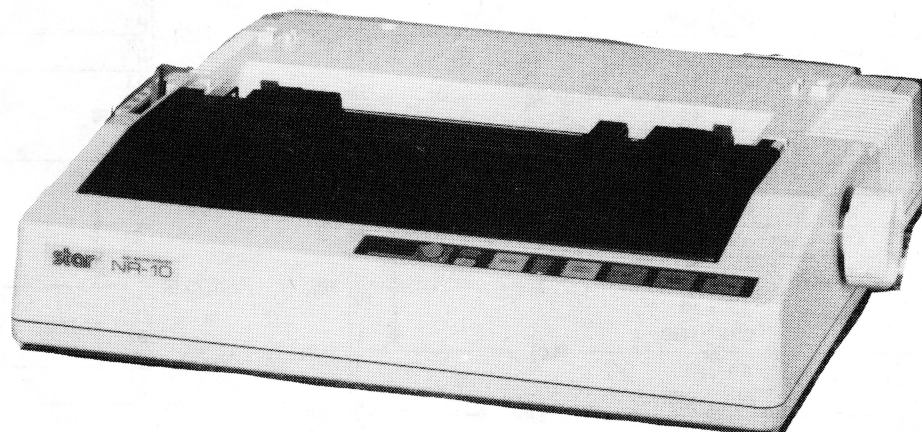
Static electricity discharge can affect the Computer. In order to minimize the possibility, use anti-static mats, sprays, tools and materials, and maintain good humidity in the Computer environment.

MONITOR

Use an isolation transformer with any Monitor that does not come as part of the system since some Monitors use a HOT chassis (chassis connected to one side of the AC line). The face of the Monitor should never be left on for long period of time at high brightness level except when pattern is being changed periodically. Use caution when cleaning anti-glare screens, to preserve the glare-reduction feature.

Star Micronics Printers are warranted for one year from date of purchase. If any service or modifications are performed during this time by other than Authorized Star Micronics Service Centers, the manufacturers' warranty will be void.

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SAFETY PRECAUTIONS

See Page 13.

PRELIMINARY SERVICE CHECKS

ENCLOSED

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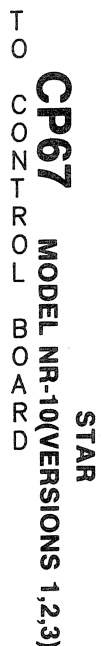
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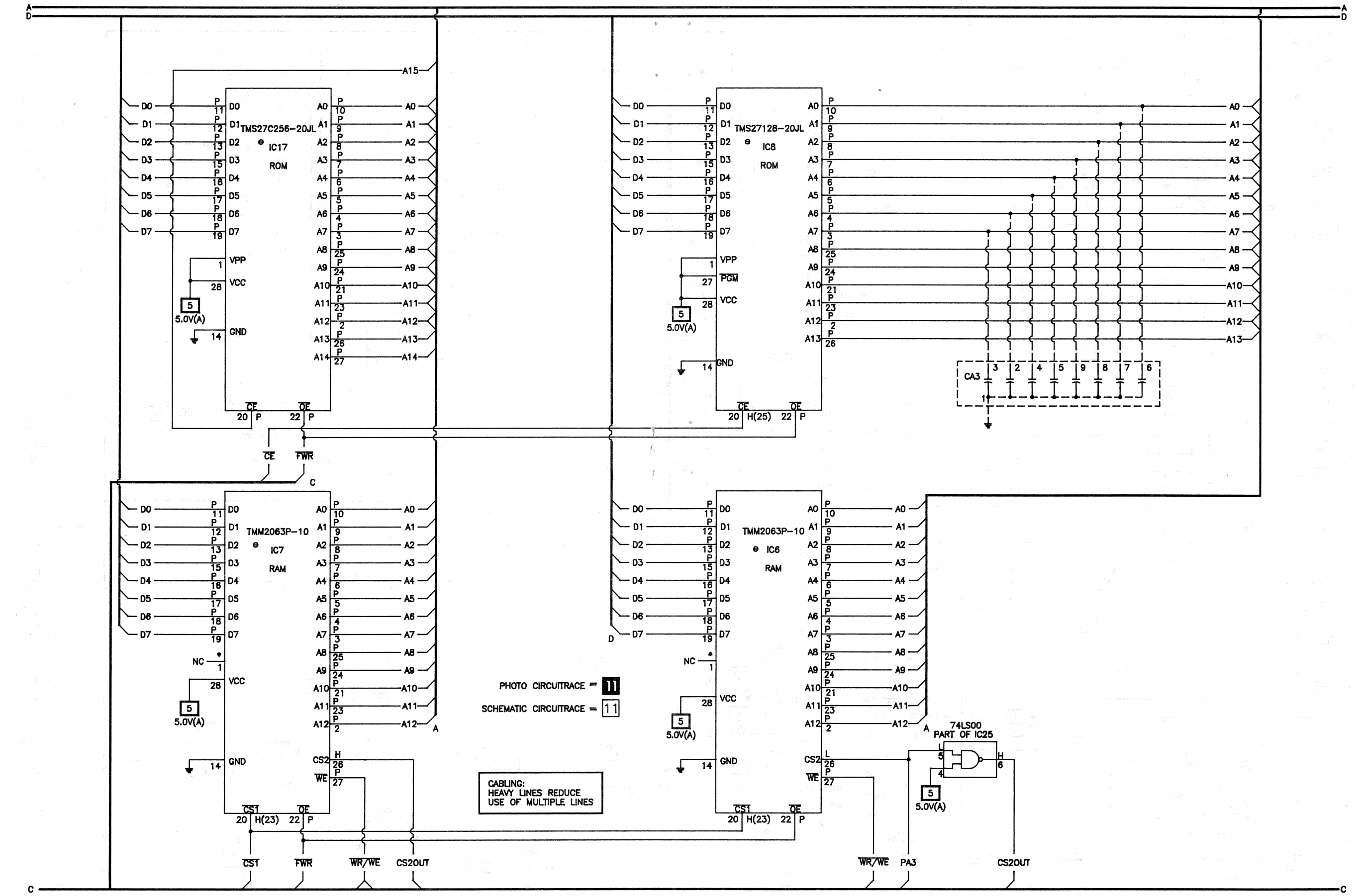
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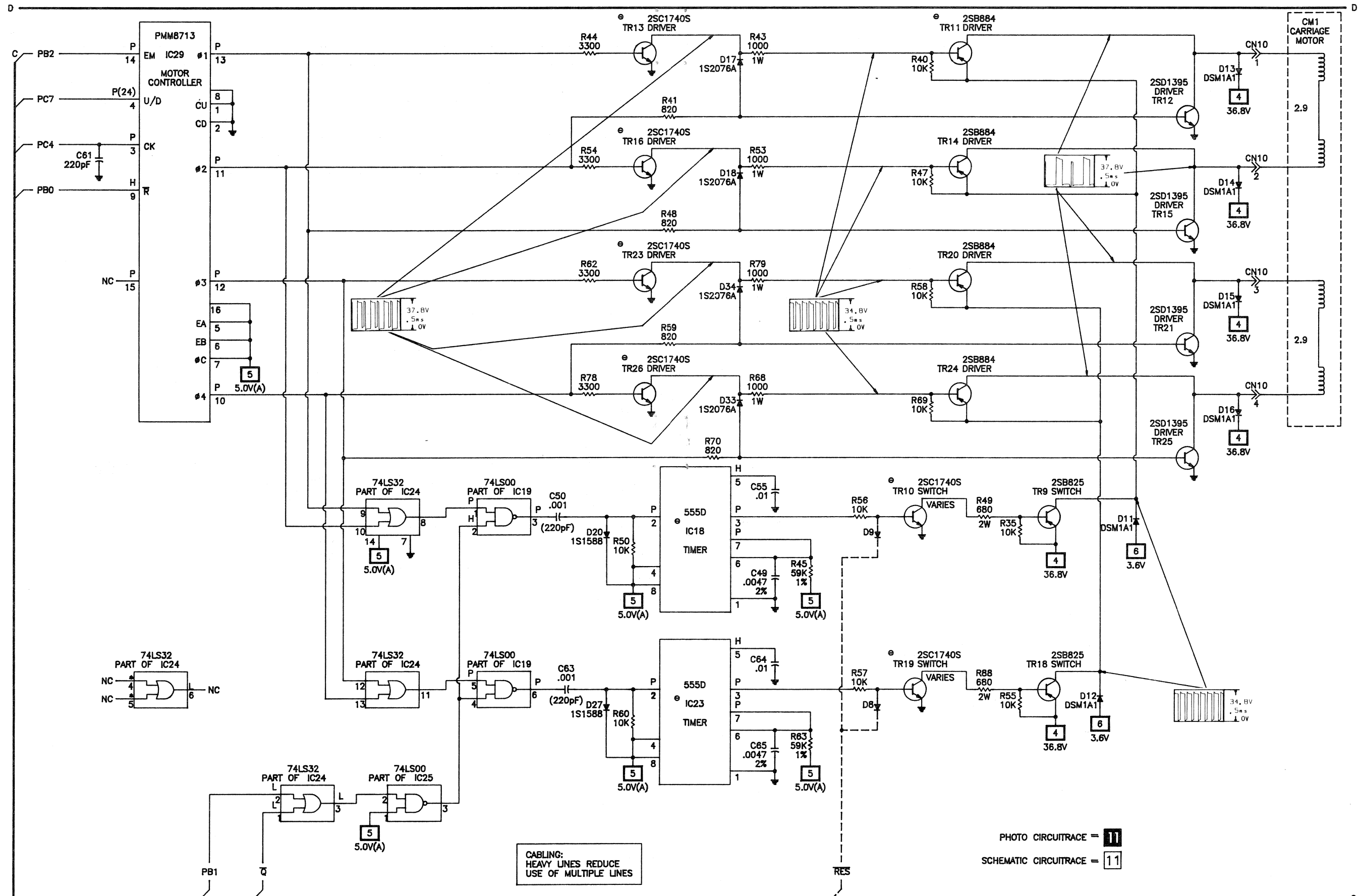


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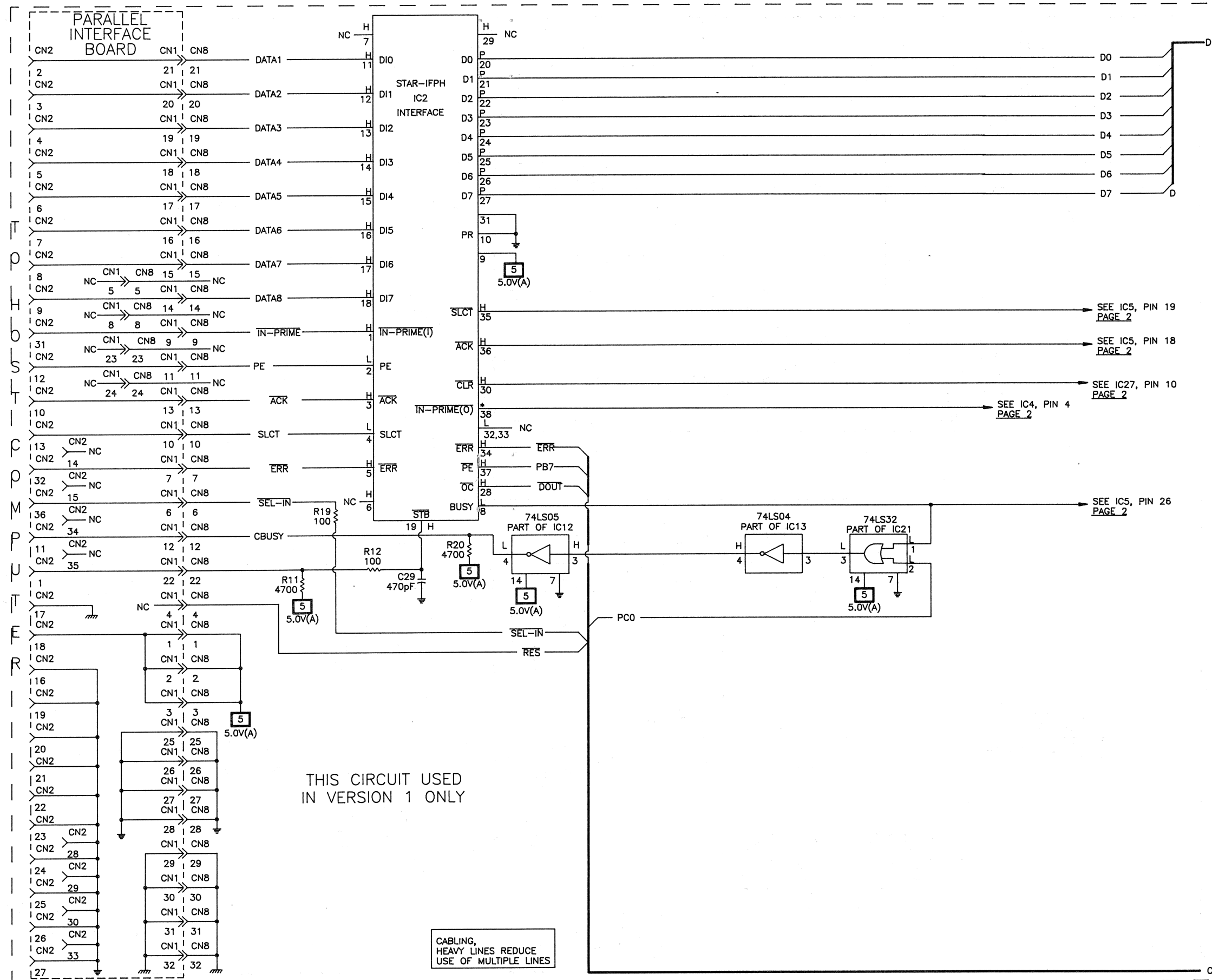
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WITH CIRCUITRACE®

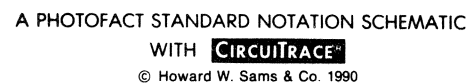


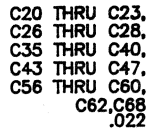


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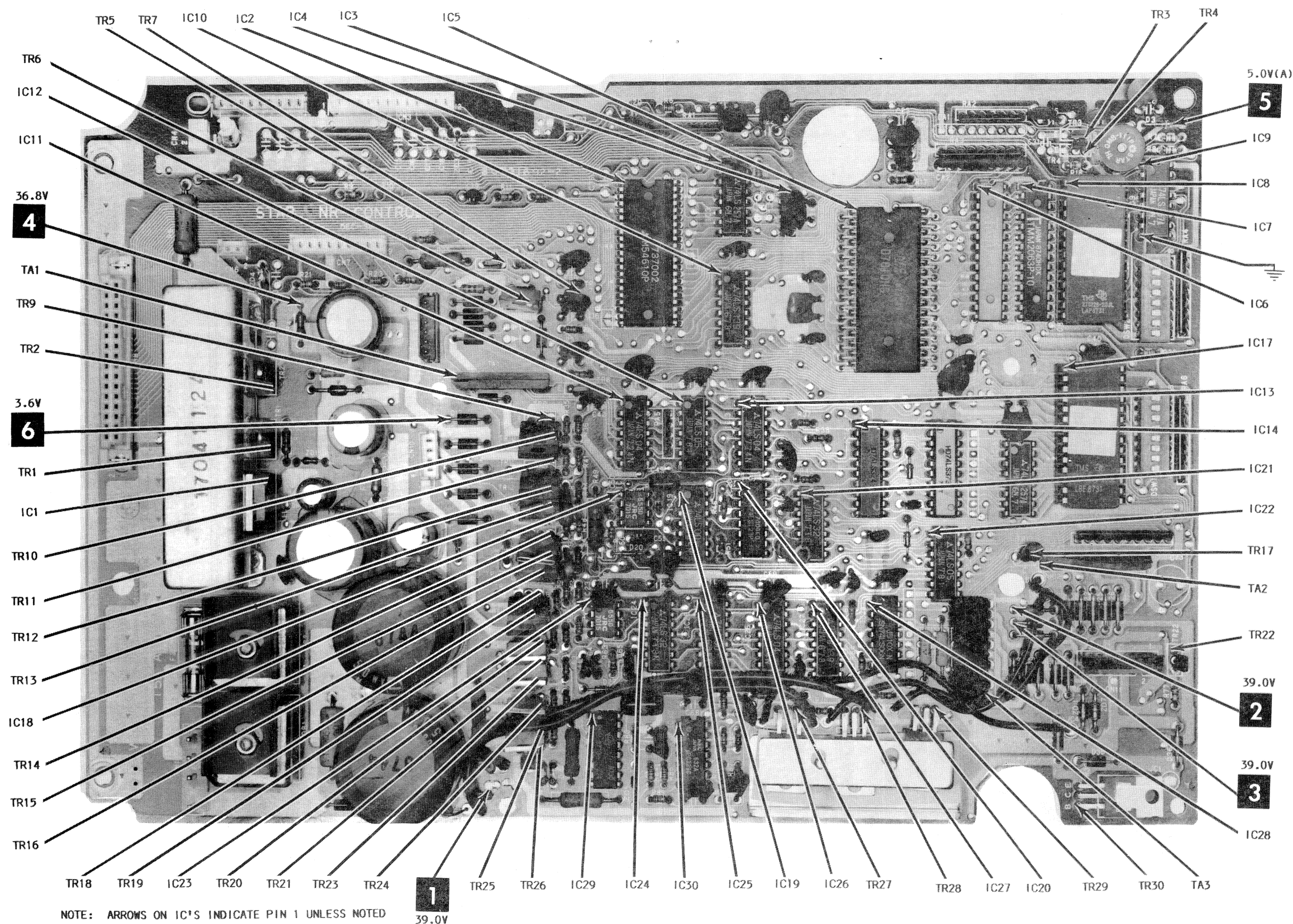
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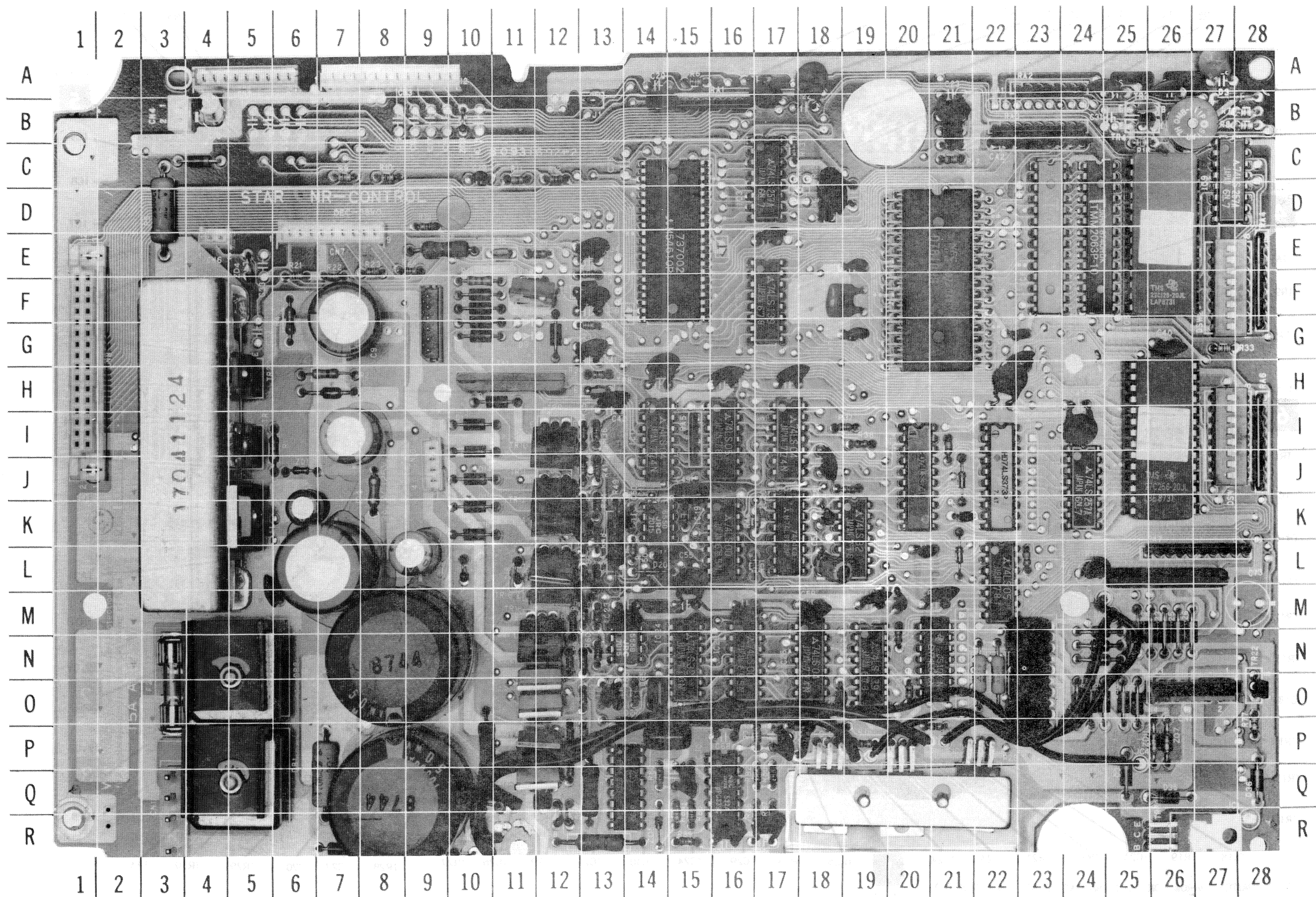






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CONTROL BOARD

CONTROL BOARD

SAFETY PRECAUTIONS

1. Use an isolation transformer for servicing.
2. Maintain AC line voltage at rated input.
3. Remove AC power from the Printer before servicing or installing electrostatically sensitive devices. Examples of typical ES devices are integrated circuits and semiconductor "chip" components.
4. Use extreme caution when handling the printed circuit boards. Some semiconductor devices can be damaged easily by static electricity. Drain off any electrostatic charge on your body by touching a known earth ground. Wear a commercially available discharging wrist strap device. This should be removed prior to applying power to the unit under test.
5. Use a grounded-tip, low voltage soldering iron.
6. Use an isolation (times 10) probe on scope.
7. Do not remove or install board, mechanical or electrical parts or other peripherals with Printer AC power On.
8. Do not use freon-propelled sprays. These can generate electrical charges sufficient to damage semiconductor devices.
9. This Printer is equipped with a grounded three-pronged AC plug. This plug must fit into a grounded AC power outlet. Do not defeat the AC plug safety feature.
10. Periodically examine the AC power cord for damaged or cracked insulation.
11. The Printer cabinet is equipped with vents to prevent heat build-up. Never block, cover or obstruct these vents.
12. Instructions should be given, especially to children, that objects should not be dropped or pushed into the vents of the cabinet. This could cause shock or equipment damage.
13. Never expose the Printer to water. If exposed to water, turn the unit Off. Do not place the Printer near possible water sources.
14. Never leave the Printer unattended or plugged into the AC outlet for long periods of time. Remove AC plug from AC outlet during lightning storms.
15. Do not allow anything to rest on AC power cord.
16. Unplug AC power cord from outlet before cleaning Printer.
17. Never use liquids or aerosols directly on the Printer. Spray on cloth and then apply to the Printer cabinet. Make sure the Printer is disconnected from the AC power line.

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GENERAL OPERATING INSTRUCTIONS

PANEL CONTROLS

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Pressing PAPER FEED button advances paper one line. Pressing TOF button advances paper to top of next page or form (Form Feed). Printer has a forward and reverse microfeed function to help in aligning the print start position. To forward microfeed, put Printer Off Line then hold ON LINE button down and press PAPER FEED button. To reverse microfeed hold ON LINE button down and press TOF button.

Margins can be set while printer is OFF LINE. For left margin hold MODE down and press TOF until the printhead reaches the desired position. For right margin hold MODE down and press PAPER FEED until printhead reaches the desired position.

To make the current paper position the Top of Form, hold PRINT PITCH down and press TOF.

To disable software control of MODE and PRINT PITCH, hold either or both buttons down while turning Printer On. Button selection will work normally. To select italic mode and disable software control of character style, hold the TOF button down while turning the Printer ON.

A hex dump can be performed by holding PAPER FEED and MODE buttons down while turning Printer On. Printer will print contents of print buffer in hex form.

DISASSEMBLY INSTRUCTIONS

UPPER CASE UNIT REMOVAL

Remove Paper and Printer ribbon. Disconnect power and remove the Platen Knob. Remove the Interface cover, and remove the Parallel Interface Board by pulling it straight up. Remove the two screws securing the Upper Case. Lift the back of the Upper Case slightly and push it towards the front of printer to separate the tabs of Upper Case from the Lower Case. Disconnect chassis lead to Control Panel and Connectors (CN2 and CN3). Remove the Upper Case.

CONTROL PANEL BOARD REMOVAL

Remove the Upper Case unit, remove the tapping screw securing the Cover Switch. Remove four screws securing the control panel board. Remove the Control Panel Board and the switch out of the Upper Case unit.

PRINTER MECHANISM REMOVAL

Remove the Upper Case. Remove the plastic door covering the ribbon cable and disconnect the print Head Cable (CN11) from the Control Board. Remove four screws securing the Printer Mechanism to the Lower Case. Disconnect Connectors CN6, CN7, CN9 and CN10 from the Control Board. Lift the Printer Mechanism out of Lower Case.

CONTROL BOARD REMOVAL

Remove the Printer Mechanism and disconnect the power supply connector CN1. Disconnect the Fan connector CN4. Remove eight screws fastening the Control Board to Lower Case. Lift the Control Board out of the Lower Case.

PAPER FEED MOTOR REMOVAL

Remove the Printer Mechanism. Remove two screws holding the Paper Feed Motor to the Printer Mechanism. Remove the Paper Feed Motor.

CARRIAGE MOTOR REMOVAL

Remove the Printer Mechanism. Remove four screws securing the Carriage Motor Holder to Printer Mechanism. Remove two screws fastening the carriage motor to holder and remove carriage motor. When the carriage motor is replaced, adjustment of Timing Belt Tension is required.

PRINT HEAD

Remove the Printer Cover and ribbon cartridge. Remove the hook holding the Print Head in place and pull up the Print Head. Remove the Print Head Connector Cover mounted to the frame, then remove the Print Head Cable connected to CN11 on the Control Board. When a new Print Head is installed, perform the Print Head Gap Adjustment.

MISCELLANEOUS ADJUSTMENTS

PRINT HEAD GAP

Set Adjustment Lever to position 1. Measure gap between Platen and Ribbon Guide with Carriage Assembly at center, left end, and at right end. All three measurements should be 0.20mm to 0.25mm. See Figure A. If any measurement is out of tolerance, loosen Adjustment Lever Nut. Insert a small rod into hole at left end of Rear Carriage Shaft, see Figure B. To adjust right end gap, rotate Rear Carriage Shaft, with rod, until proper gap measurement is obtained. To adjust center and left end gap, hold Rear Carriage Shaft in position with rod, and rotate Left Adjustment Bushing until proper gap measurement is obtained. After adjustment is complete, tighten Adjustment Lever Nut, while ensuring that Left Adjustment Bushing and Rear Carriage Shaft do not move.

FIGURE A

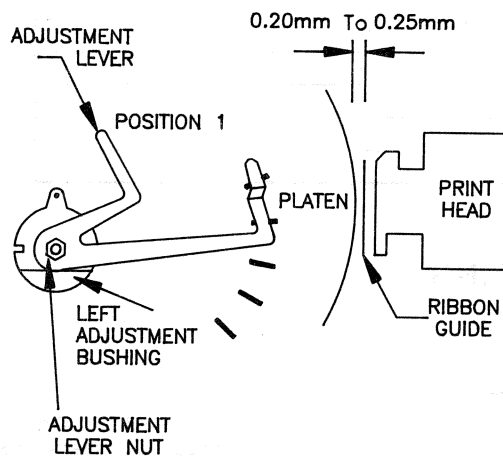
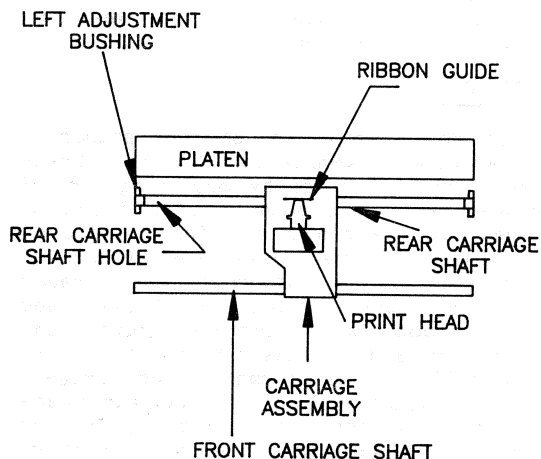


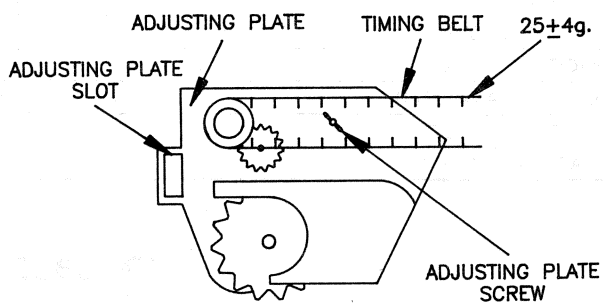
FIGURE B



TIMING BELT TENSION

Set Adjustment lever to position 1, see Figure A. Position Carriage Assembly to right end. Check Timing Belt Tension for $25 \pm 4g$ ($3/4$ to 1 oz) to deflect the back length of the timing belt $5/64$ " to the front, measured 5 inches to the right of the center of the Timing Pulley. If measurement is not correct, loosen screw securing Adjusting Plate, see Figure C. Insert a common screwdriver into slot on Adjusting Plate and adjust until proper Timing Belt tension is obtained. Tighten adjusting Plate Screw.

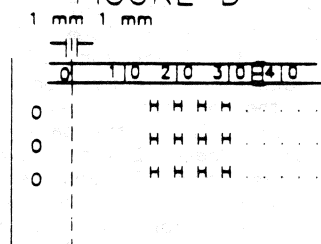
FIGURE C



HOME POSITION DETECTOR

Initiate Printer Self Test. Left margin should be in line with "0" on Ball Roller Scale $\pm 1mm$. If left margin is out of position, loosen Home Position Detector Screw. Reposition Home Position Detector so left margin is properly positioned, see Figure D. Tighten Home Position Detector Screw.

FIGURE D



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TEST EQUIPMENT

Test Equipment listed by Manufacturer illustrates typical or equivalent equipment used by SAMS' Engineers to obtain measurements and is compatible with most types used by field service technicians.

Equipment	B&K Precision Equipment No.	Sencore Equipment No.	Notes
OSCILLOSCOPE	1541A, 2120, 2125, 2160	SC61	
LOGIC PROBE	DP51, DP21		
LOGIC PULSER	DP101, DP31		
DIGITAL VOM	388HD, 2800 SERIES, 2900 SERIES	DVM37, DVM56A, SC61	
ANALOG VOM	114, 117, 177, 214		
ISOLATION TRANSFORMER	TR110, 1604, 1653, 1655	PR57	
FREQUENCY COUNTER	1803, 1804, 1805	FC71, SC61	
COLOR BAR GENERATOR	1211B, 1251, 1260, 1249	CG25, VA62A, NT64	
RGB GENERATOR	1260, 1249	RG67	
FUNCTION GENERATOR	3020, 3011A, 3026, 3030		
HI-VOLTAGE PROBE VOM/DMM Accessory probes	HV-44 PR-28(HV)	HP200 TP212	
TEMPERATURE PROBE	TP-28, TP-30		
CRT ANALYZER	467, 470, 480, 490	CR70	
DIGITAL IC TESTER	560, 550, 552		
CAPACITANCE ANALYZER	810, 820, 830	LC76, LC101, LC102	
INDUCTANCE ANALYZER		LC76, LC101, LC102	
TRANSISTOR TESTER		TF46	
FLYBACK-YOKE TESTER		LC76, LC101, LC102	

TROUBLESHOOTING

POWER SUPPLY

Printer is dead. Check Fuse (F1) on the Fuse Board. If Fuse is open check Power Transformer (T1) and Fuse Board components for possible shorts. If Fuse F1 is good, check for 30.2VAC between pins 1 and 2 and 8.2VAC between pins 3 and 4 of Connector CN1. If either voltage is missing, check for 120VAC between pins NW and LB of Transformer Connector. If 120VAC is present, check Power Transformer by substitution. If voltage is missing, check Power Switch (SW1). If AC voltages are present on Connector CN1, check for 39.0V at collector of Regulator Transistor (TR2). If voltage is missing, check Fuse (F4), Electrolytics (C1,C2) and Bridge Rectifier (DB1). If 39V is present at collector of TR2, check for 36.3V at the emitter of TR2 and 40.3V at the cathode of Diode D1. If 36.3V is missing, check for 36.9V at the base of regulator TR2. If 36.9V is missing, check TR2, Zener Diode ZD2, Diode D1 and Electrolytic C8. Check for 8.9V at the collector of Regulator Transistor (TR1). Check for 3.6V at the emitter of TR1. If 3.6V is missing check for 4.2V at the base of TR1. If 4.2V is missing check Zener Diode ZD1, Resistor R1 and Transistor TR1 and associated components. If 8.9V is missing at the collector of the Regulator Transistor TR1, check Fuse F2 and Diode Bridge (DB2). Check for 5V at the output of Regulator IC (IC1). If the 5V is missing, check IC1 by substitution.

CPU OPERATION

Check for pulses on pins 47 thru 62 of CPU IC (IC13). If the pulses are missing, check for 5V at pins 42, 43, 63 and 64 of IC13. If the 5V is missing, refer to "Power Supply" section of this Troubleshooting guide. If 5V is present, check for 14MHz waveforms on pins 30 and 31 of IC5. If waveforms are missing or incorrect, check crystal (XTAL1) and associated components. If waveforms are correct at pins 30 and 31 of IC5, check for momentary logic low on pin 28 (RESET) of IC5, when the printer is first turned On.

PAPER FEED MOTOR

Paper Feed Motor does not operate properly. Check Platen Gear Assembly for binding. Check Paper Feed Motor windings by measuring for 36 ohms between pin 1 and each of pins 3 and 4, and between pin 2 and each of pins 5 and 6 of Connector CN9. If the resistance of any of the motor windings is incorrect, check Paper Feed motor by substitution. If Paper Feed Motor checks good, press Form Feed Button and check waveforms and signals at pin 5, 9, 11 and 13 of IC12. If waveforms are not present check IC5 by substitution. If waveforms are present check waveforms at pins 6, 8, 10 and 12 of IC12. If waveforms are missing check IC12. Check waveforms at pins 3, 4, 5 and 6 of Connector CN9. If waveforms are missing

TROUBLESHOOTING (Continued)

check Transistor Array (TA1) by substitution. Check transistors TR4, TR5 and TR6 and associated circuitry.

CARRIAGE MOTOR

Carriage Motor does not work. Check timing belt. Move Carriage Assembly manually and check for binding or obstructions. If Carriage Assembly moves slightly and stops and the alarm buzzer sounds, check Home Position Sensor by referring to "Verify Sensor Operation" section of this Troubleshooting guide. Check Carriage Motor windings by measuring for 2.9 ohms resistance between pins 1 and 2 and pins 3 and 4 of Connector CN10. If the resistance of either of the windings is incorrect, check Carriage Motor by substitution.

Set the printer to perform self-test and check for pulses at IC29 pins 3, 4, 9 and 14. If pulses are missing, check IC5 by substitution. If pulses are present check for pulses at IC29 pins 10, 11, 12 and 13. If pulses are missing check IC29. If pulses are present check waveforms at the bases of TR11, TR14, TR20 and TR24. If waveforms are missing check transistors TR13, TR16, TR23 and TR26, and associated components. If waveforms are present check for waveforms at Collectors of TR9 and TR18. If waveforms are present, check transistors TR15, TR16, TR21 and TR25 and associated components. If waveforms are missing check for pulses at pin 3 of IC18 and IC23. If pulses are found check transistors TR9, TR10, TR18 and TR191, and associated components. If pulses are missing check for pulses at IC19 pin 3 and IC19 pin 6. If pulses are found check IC18 and IC23, and associated components. If pulses are missing check IC19, IC24 and IC25.

PRINT HEAD

Print Head does not print correctly, disconnect Print Head cable from Connector CN11. Check for 6 ohms resistance between pin 7 and pins 1, 2, and 5 between pin 6 and pins 3, 4 and 11, and between pin 8 and pins 12, 13 and 14 of the Print Head Cable. If any of the resistances are not correct, check the Print Head by substitution.

Before replacing the Print Head, check the Driver Transistor Arrays (TA2 and TA3) and Transistor TR30 associated with the defective Print Head Solenoid.

NOTE: New Print Head may be damaged if printing is resumed with a defective driver transistor.

If the Print Head checks good, set the printer in self test and check for the waveform at IC14 Pin 1. If the waveform is present check TR22 and associated components. If the waveform is missing, check IC21. If the signal is present, check for the signal at the Collector of TR22. If the signal is missing check Transistor TR22 by substitution.

If the signal is present at pin 1 of IC14 check waveforms at inputs and the outputs of IC14. If waveforms are present at inputs and missing at output, check IC14 by substitution. If waveforms are missing at inputs, check the CPU (IC5) by substitution.

If signals are present at outputs of IC14, check for signals at inputs and outputs of Transistor Arrays (TA2 and TA3). If input signals are missing check inverters (IC22 and IC28). If Transistor Array input signals are good and outputs are missing check Arrays and associated components.

PRINTER WILL NOT RECEIVE DATA (SELF-TEST WORKS) (VERSION 3)

Connect printer to computer and program computer to send information to the printer. Check for data pulses on pins 11 thru 18 of Interface IC (IC2). If pulses are present check for pulses on pins 22 thru 29 of IC2. If pulses are not present at pins 22 thru 29 check IC2 by substitution. If pulses are missing on pins 11 thru 18 of IC2, check Connector CN2, Parallel Interface Card in the computer, and the Printer Interface Cable.

VERIFY SENSOR OPERATION

Buzzer: Turn printer on without paper installed. Buzzer should sound momentarily. If buzzer fails to operate, check IC13, Transistor (TR3), Buzzer (Bz), Diode (D3) and the CPU (IC5).

Paper Empty Sensor: Make sure that Dip Switch 1-1 is On to detect paper. Check for logic high on pin 41 of CPU (IC5) which will change to a logic low when printer runs out of paper. If logic is not correct, check IC13 pins 12 and 13, Switch Transistor (TR7) and Paper End Sensor (M2). If the logic reading on pin 41 of IC5 is correct and the printer continues to print when out of paper, check the Paper End Sensor M2 for shorts, and check IC5 by substitution.

Head Temperature Sensor: Disconnect the printhead and connect a 10K variable resistance between CN11 pins 9 and 10. Start Self Test. With the variable resistance at 10K, the printer should print the test in bi-directional mode, and the voltage at IC30 pins 8 and 10 should be between 0 and 2.6V. Reduce the variable resistance to a value of from 2.2K to 1.44K. The test should print in left to right direction only, and the voltage at IC30 pins 8 and 10 should be 2.65V to 3V. Reduce the variable resistance to a value of from 1.4K to 0. The printer should stop printing and the voltage at pins 8 and 10 of IC30 should be 3V or over.

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LOGIC CHARTS

PIN NO.	IC 2	PIN NO.	IC 2	PIN NO.	IC 2	PIN NO.	IC 3	IC 5	PIN NO.	IC 5	PIN NO.	IC 5	PIN NO.	IC 5
1	H	21	L	41	H	1	P	L	21	P	41	H	61	P
2	*	22	P	42	H	2	H	H(23)	22	H	42	H	62	P
3	H	23	P			3	H	H(21)	23	P(22)	43	H	63	H
4	H	24	P			4	P	L	24	P(24)	44	P	64	H
5	H	25	P			5	H	H	25	H	45	P		
6	L	26	P			6	H	H(21)	26	L	46	P		
7	L	27	P			7	P	H(21)	27	P	47	P		
8	L	28	P			8	L	H(21)	28	H	48	P		
9	L	29	P			9	P	H	29	H(23)	49	P		
10	H	30	H			10	L	L	30	P	50	P		
11	H	31	H			11	H	P	31	P	51	P		
12	H	32	L			12	P	H	32	L	52	P		
13	H	33	H			13	L	H	33	L	53	P		
14	H	34	H			14	H	H	34	H	54	P		
15	H	35	L			15	H	L	35	H(10)	55	P		
16	H	36	L			16	H	H	36	H	56	P		
17	H	37	H			17		L	37	H	57	P		
18	H	38	H			18		H	38	H	58	P		
19	H	39	H			19		H	39	H	59	P		
20	H	40	L			20		P	40	H	60	P		

PIN NO.	IC 6	PIN NO.	IC 6	PIN NO.	IC 7	PIN NO.	IC 7	PIN NO.	IC 8	PIN NO.	IC 8
1	*	21	P	1	*	21	P	1	H	21	P
2	P	22	P	2	P	22	P	2	P	22	P
3	P	23	P	3	P	23	P	3	P	23	P
4	P	24	P	4	P	24	P	4	P	24	P
5	P	25	P	5	P	25	P	5	P	25	P
6	P	26	L	6	P	26	H	6	P	26	P
7	P	27	P	7	P	27	P	7	P	27	H
8	P	28	H	8	P	28	H	8	P	28	H
9	P			9	P			9	P		
10	P			10	P			10	P		
11	P			11	P			11	P		
12	P			12	P			12	P		
13	P			13	P			13	P		
14	L			14	L			14	L		
15	P			15	P			15	P		
16	P			16	P			16	P		
17	P			17	P			17	P		
18	P			18	P			18	P		
19	P			19	P			19	P		
20	H(23)			20	H(23)			20	H(25)		

LOGIC CHARTS

PIN NO.	IC 9	IC 10	IC 11	IC 12	IC 13	IC 14	IC 15	IC 16	IC 17	PIN NO.	IC 17
1	P	L	L(27)	L	P	P	L	P	H	21	P
2	L	H	H(28)	L(23)	P	*(23)	P	L	P	22	P
3	L	H	H(28)	H	H	P	P	L	P	23	P
4	P	H	L(27)	L	L	P	P	P	P	24	P
5	L	H	L	H(3)	L(11)	*(23)	P	L	P	25	P
6	L	H	L	L(3)	H(10)	*(23)	P	L	P	26	P
7	P	L	L	L	L	P	P	P	P	27	P
8	L	L	L	L(3)	H	P	P	L	P	28	H
9	P	P	H	H(3)	L	*(23)	P	P	P		
10	L	H(23)	H	L(3)	L(2)	L	L	L	P		
11	L	H(25)	L	H(3)	H(1)	H(23)	P	L	P		
12	P	H(26)	L	L(3)	H	*(23)	P	P	P		
13	L	P	H	H(3)	L	P	P	L	P		
14	L	P	H	H	H	P	P	L	P		
15	H(9)	P				*(23)	P	H(9)	P		
16	H	H				*(23)	P	H	P		
17						P	P		P		
18						P	P		P		
19						*(23)	P		P		
20						H	H		P		

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PIN NO.	IC 18	IC 19	IC 20	IC 21	IC 22	IC 23	IC 24	IC 25	IC 26	IC 27	IC 28	IC 29
1	L	P	*	*	H(23)	L	L	H	P	H	H(23)	L
2	P	H	*	*	L(23)	P	L	L	P	P	L(23)	L
3	P	P	*	H	H(23)	P	L	H	L	P	*	P
4	H	H	L	L(23)	L(23)	H	*	H	H	H	L	P(24)
5	H	P	H	H(23)	*(23)	H	*	L	*	H	*(23)	H
6	P	P	L	H(23)	L(23)	P	H	L	L	H	L(23)	H
7	P	L	P	L	L	P	L	L	L	H	L	H
8	H	H(25)	L	H(23)	L(23)	H	P	H	P	L	L(23)	L
9		H	P	H(23)	*(23)		P	P	P	H	*(23)	H
10		L(25)	H	H(23)	L(23)		P	P	P	H	L(23)	P
11		L(25)	H	H(23)	*(23)		P	P	P	P	*(23)	P
12		H(26)	L	H(23)	L(23)		P	P	L	H(23)	L(23)	P
13		H(25)	H	H(23)	*(23)		P	P	H		*(23)	P
14		H	L	H	H		H	H	H	P	H	P
15			*							P		P
16			H							H		H

SWITCHES AND JUMPERS

DIP SWITCH SETTINGS

"Caution": Do not change the Dip Switch setting when the printer or connected computer power is "ON".

DSW1-1 If "ON" the printer will stop printing when it runs out of paper. If "OFF" this switch disables the paper out detector.

DSW1-2 If "ON" the SELECT IN signal of the parallel interface is held low. If "OFF" the SELECT IN signal is controlled by host computer (when High, printer cannot accept data).

DSW1-3 If "ON" the down load character definitions are ignored and the RAM is used as a print buffer. If "OFF" the down load character definitions are enabled and the buffer is reduced to one line.

DSW1-4 If "ON" the default line spacing is set to 1/6 inch. If "OFF" the default line spacing is set to 1/8 inch.

DSW1-5 If "ON" Line Feed is required from the host computer. If "OFF" one Line Feed is automatically performed with every carriage return.

DSW1-6 If "ON" bottom margin is not set at Power On. If "OFF" bottom margin is set to one inch.

DSW1-7 If "ON" the default pitch is normal Pica pitch (10CPI). If "OFF" the default pitch is condensed Pica pitch (17CPI).

DSW1-8 If "ON" the zeros will be printed without slashes. If "OFF" the printer will print slashed zeros.

DIP SWITCH 2

DSW2-1 If "ON" the default character style is normal draft. If "OFF" the default character style is set to Near Letter Quality.

DSW2-2 If "ON" the printer emulates the Epson FX-85 printer (Standard). If "OFF" the printer uses the "IBM" compatible mode.

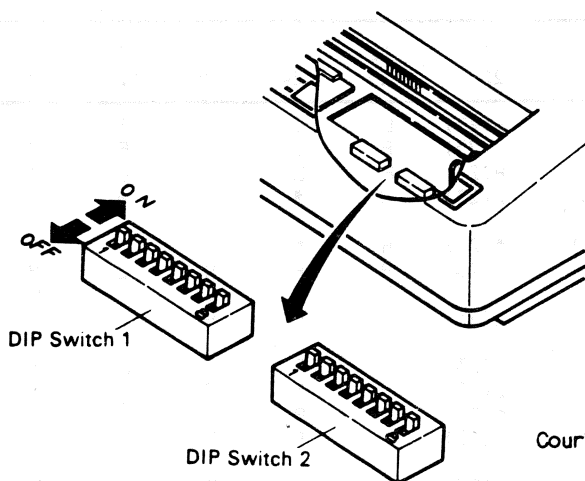
DSW2-3 If "ON" and DSW2-2 is "OFF", the printer emulates IBM-P (Proprinter). If "OFF" and DSW2-2 is "OFF", the printer emulates IBM-G (Graphic printer).

DSW2-4 This switch function depends on the setting of Switch DSW2-2. If DSW2-2 "ON": DSW2-4 "ON" sets MINIMUM line feed value to 1/216 inch, DSW2-4 OFF sets MINIMUM line feed value to 1/144 inch.

If DSW2-2 is OFF: DSW2-4 "ON" selects Character Set #1, OFF selects Character Set #2.

DSW2-5 If "ON" the print head will return to the left margin after the paper advance. If "OFF" the print head will not return to the left margin after the paper advance.

DSW2-6 thru 2-8 will select the default international character set. See Chart.



Courtesy of Manufacturer

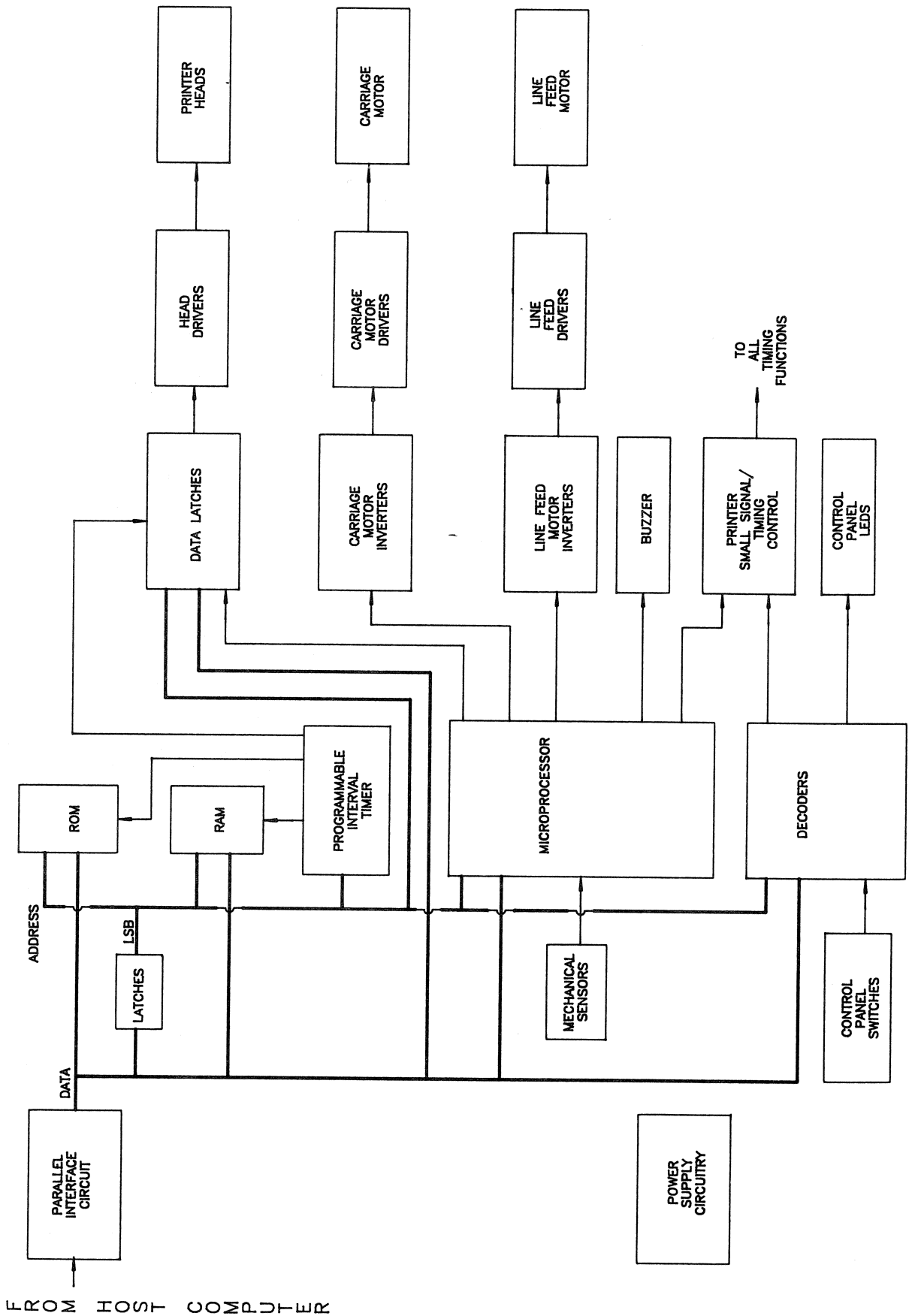
The DIP Switches are located under the Printer Cover

International Character Sets

SWITCH	USA	FRANCE	GERMANY	ENGLAND	DENMARK	SWEDEN	ITALY	SPAIN
2-6	ON	OFF	ON	OFF	ON	OFF	ON	OFF
2-7	ON	ON	OFF	OFF	ON	ON	OFF	OFF
2-8	ON	ON	ON	ON	OFF	OFF	OFF	OFF

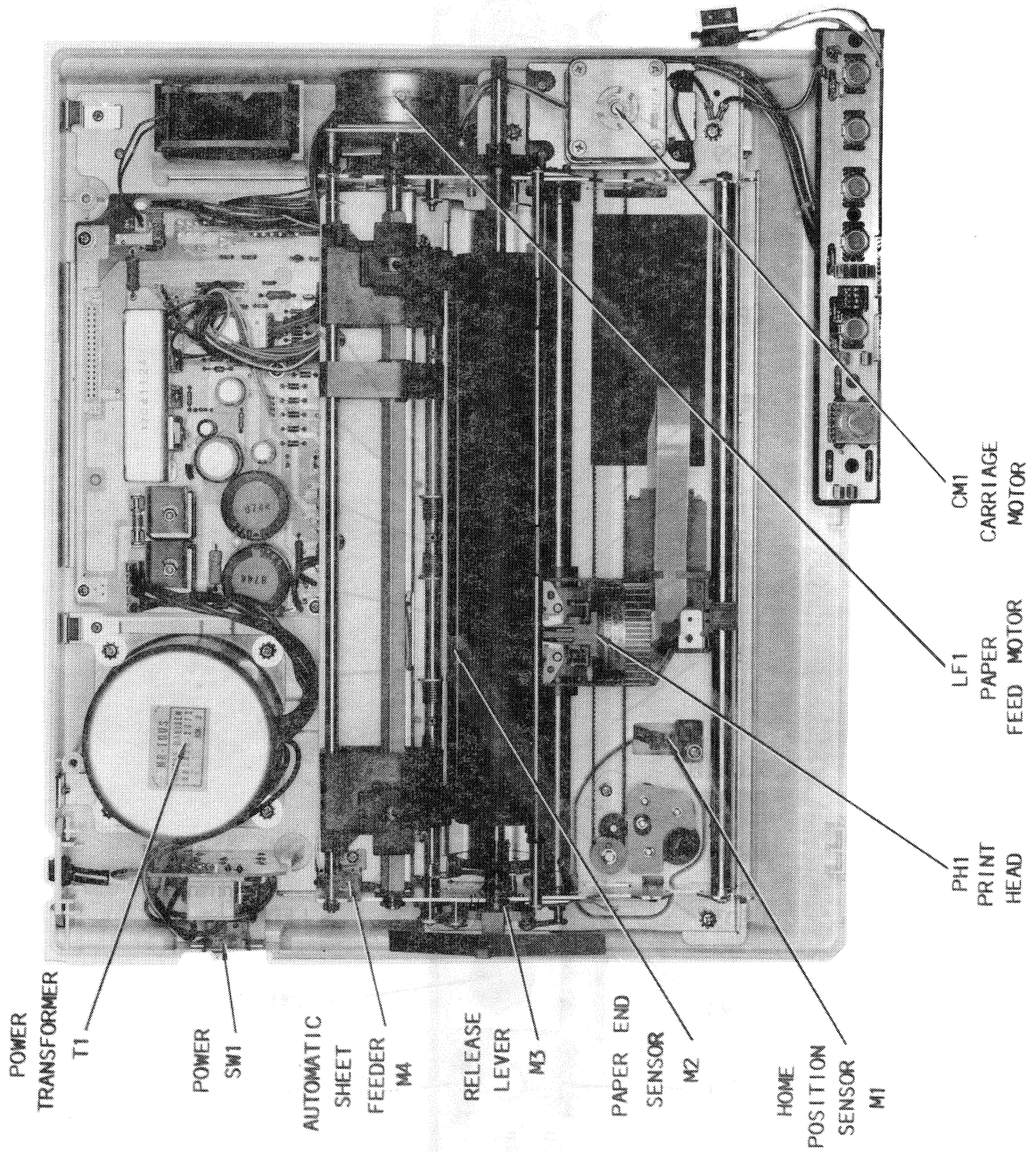
BLOCK DIAGRAM

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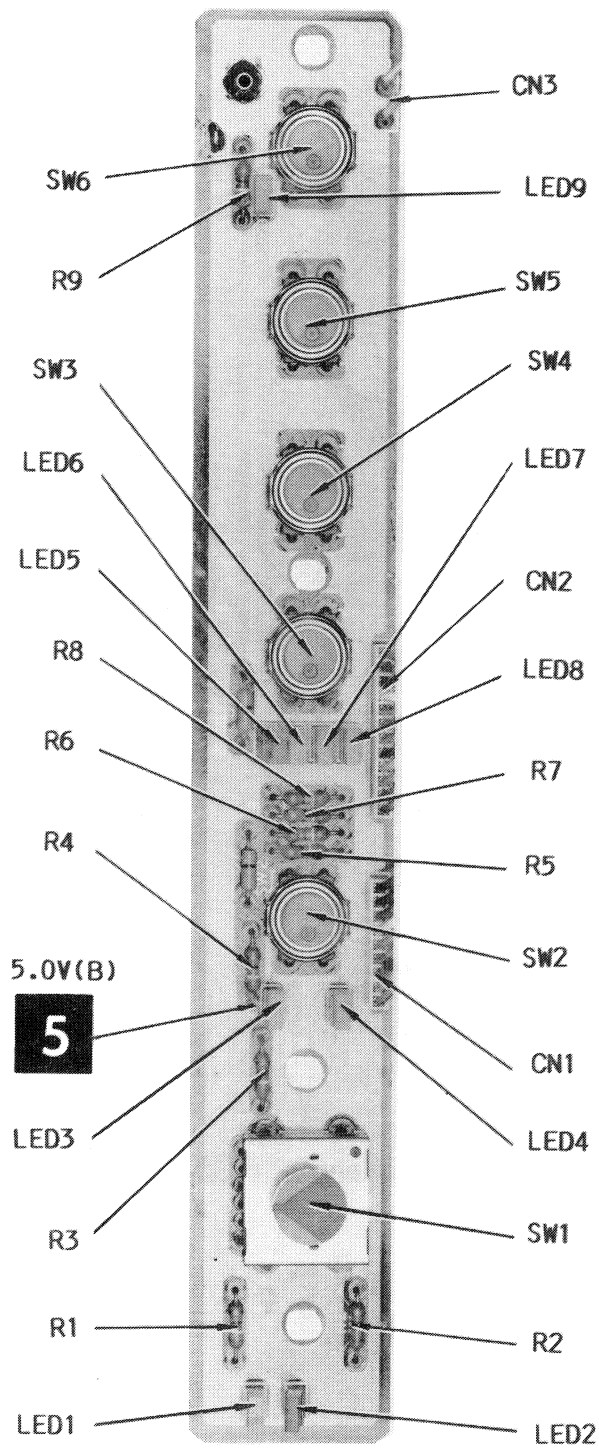


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CHASSIS-OVERALL VIEW



PARTS LIST AND DESCRIPTION

When ordering parts, state Model, Part Number, and Description

SEMICONDUCTORS (Select replacement for best results)

ITEM No.	MFGR. PART No./ TYPE No.				
		NTE PART No.	ECG PART No.	TCE PART No.	NOTES
	<u>CONTROL BOARD</u>				
D1,2	DSM1A1	NTE587	ECG587		
	08000040	NTE587	ECG587		
D3	1S1588	NTE519	ECG519	SK3100/519	
	08000039	NTE519	ECG519	SK3100/519	
D4 THRU D7	DSM1A1	NTE587	ECG587		
	08000040	NTE587	ECG587		
D10 THRU D16	DSM1A1	NTE587	ECG587		
	08000040	NTE587	ECG587		
D17,18	1S2076A	NTE519	ECG519	SK3100/519	
	08000015	NTE519	ECG519	SK3100/519	
D19 THRU D21	1S1588	NTE519	ECG519	SK3100/519	
	08000039	NTE519	ECG519	SK3100/519	
D22 THRU D26	DSM1A1	NTE587	ECG587		
	08000040	NTE587	ECG587		
D27	1S1588	NTE519	ECG519	SK3100/519	
	08000039	NTE519	ECG519	SK3100/519	
D28 THRU D32	DSM1A1	NTE587	ECG587		
	08000040	NTE587	ECG587		
D33,4	1S2076A	NTE519	ECG519	SK3100/519	
	08000015	NTE519	ECG519	SK3100/519	
D35,6	DSM1A1	NTE587	ECG587		
	08000040	NTE587	ECG587		
DB1,2	S10VB10	NTE5312	ECG5312	SK3985/5312	
	08990210	NTE5312	ECG5312	SK3985/5312	
IC1	3052V				
	S1-3052V				
	08200093				
IC2	M54610P				
	08200101				
	STAR-IFPH				
	08200073				VERSIONS 1 AND 2
IC3	74LS257A	NTE74LS257	ECG74LS257	SK74LS257	
	74LS257	NTE74LS257	ECG74LS257	SK74LS257	
	08210040	NTE74LS257	ECG74LS257	SK74LS257	
IC4	M51953B				
	M51953BL				
	08200109				
IC5	D7810HG				
	UPD7810H				
	08220073				
	[uPD7810H]				
IC6,7	TMM2063P-10				
	TMM2063P-150				
	08220103				

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PARTS LIST AND DESCRIPTION (Continued)

When ordering parts, state Model, Part Number, and Description

SEMICONDUCTORS (Select replacement for best results)

ITEM No.	MFGR. PART No./ TYPE No.				NOTES
		NTE PART No.	ECG PART No.	TCE PART No.	
IC8	TMS27128-20JL TMS27128AD-200 08220082				
IC9	74LS257A 74LS257 08210040	NTE74LS257 NTE74LS257 NTE74LS257	ECG74LS257 ECG74LS257 ECG74LS257	SK74LS257 SK74LS257 SK74LS257	
IC10	74LS139 08210046	NTE74LS139 NTE74LS139	ECG74LS139 ECG74LS139	SK74LS139 SK74LS139	
IC11	74LS04 08210002	NTE74LS04 NTE74LS04	ECG74LS04 ECG74LS04	SK74LS04 SK74LS04	
IC12	74LS05 08210017	NTE74LS05 NTE74LS05	ECG74LS05 ECG74LS05	SK74LS05 SK74LS05	
IC13	74LS04 08210002	NTE74LS04 NTE74LS04	ECG74LS04 ECG74LS04	SK74LS04 SK74LS04	
IC14	HD74LS374P 74LS374P 08210052	NTE74LS374 NTE74LS374 NTE74LS374	ECG74LS374 ECG74LS374 ECG74LS374	SK1918 SK1918 SK1918	
IC15	HD74LS373P 74LS373 08210038	NTE74LS373 NTE74LS373 NTE74LS373	ECG74LS373 ECG74LS373 ECG74LS373	SK74LS373 SK74LS373 SK74LS373	
IC16	74LS257A 74LS257 08210040	NTE74LS257 NTE74LS257 NTE74LS257	ECG74LS257 ECG74LS257 ECG74LS257	SK74LS257 SK74LS257 SK74LS257	
IC17	TMS27C256-20JL 27256-250 08220096				
IC18	555D NE555 08210008	NTE955M NTE955M NTE955M	ECG955M ECG955M ECG955M	SK3564/955M SK3564/955M SK3564/955M	
IC19	74LS00 08210001	NTE74LS00 NTE74LS00	ECG74LS00 ECG74LS00	SK74LS00 SK74LS00	
IC20	M74LS123P 74LS123 08210059	NTE74LS123 NTE74LS123 NTE74LS123	ECG74LS123 ECG74LS123 ECG74LS123	SK74LS123 SK74LS123 SK74LS123	
IC21	74LS32 08210053	NTE74LS32 NTE74LS32	ECG74LS32 ECG74LS32	SK74LS32 SK74LS32	
IC22	74LS05 08210017	NTE74LS05 NTE74LS05	ECG74LS05 ECG74LS05	SK74LS05 SK74LS05	
IC23	555D NE555 08210008	NTE955M NTE955M NTE955M	ECG955M ECG955M ECG955M	SK3564/955M SK3564/955M SK3564/955M	
IC24	74LS32 08210053	NTE74LS32 NTE74LS32	ECG74LS32 ECG74LS32	SK74LS32 SK74LS32	
IC25	74LS00 08210001	NTE74LS00 NTE74LS00	ECG74LS00 ECG74LS00	SK74LS00 SK74LS00	
IC26	74LS04 08210002	NTE74LS04 NTE74LS04	ECG74LS04 ECG74LS04	SK74LS04 SK74LS04	
IC27	74LS139 08210046	NTE74LS139 NTE74LS139	ECG74LS139 ECG74LS139	SK74LS139 SK74LS139	

PARTS LIST AND DESCRIPTION (Continued)

When ordering parts, state Model, Part Number, and Description

SEMICONDUCTORS (Select replacement for best results)

ITEM No.	MFR. PART No./ TYPE No.				
		NTE PART No.	ECG PART No.	TCE PART No.	NOTES
IC28	SN74LS06N 74LS06				
IC29	08210103 PMM8713				
IC30	08200103 UPC339C 08220092 [uPC339C]	NTE834 NTE834	ECG834 ECG834	SK3569/834 SK3569/834	
TA1	STA404A 07650017				
TA2,3	UPA1436H 07650021 [uPA1436H]				
TR1	D1273Q 2SD1273Q 2SD1273 07312731	NTE56 NTE56 NTE56	ECG56 ECG56 ECG56	SK9364/56 SK3896/261 SK9364/56	
TR2	D1593M 2SD1593M 2SD1593KL 07315931				
TR3	C1740S 2SC1740S 2SC1740 07227853	NTE85 NTE85 NTE85 NTE85	ECG85 ECG85 ECG85 ECG85	SK3122 SK3122 SK3122 SK3122	
TR4	A933S 2SA933S 2SA933 07011752	NTE290A NTE290A NTE290A NTE290A	ECG290A ECG290A ECG290A ECG290A	SK9132 SK9132 SK9132 SK9132	
TR5	C1740S 2SC1740S 2SC1740 07227853	NTE85 NTE85 NTE85 NTE85	ECG85 ECG85 ECG85 ECG85	SK3122 SK3122 SK3122 SK3122	
TR6	B825 2SB825 07108251	NTE197 NTE197 NTE197	ECG197 ECG197 ECG197	SK3083/197 SK3083/197 SK3083/197	
TR7,8	C1740S 2SC1740S 2SC1740 07227853	NTE85 NTE85 NTE85 NTE85	ECG85 ECG85 ECG85 ECG85	SK3122 SK3122 SK3122 SK3122	
TR9	B825 2SB825 07108251	NTE197 NTE197 NTE197	ECG197 ECG197 ECG197	SK3083/197 SK3083/197 SK3083/197	
TR10	C1740S 2SC1740S 2SC1740 07227853	NTE85 NTE85 NTE85 NTE85	ECG85 ECG85 ECG85 ECG85	SK3122 SK3122 SK3122 SK3122	

CP67 STAR
MODEL NR-10(VERSIONS 1,2,3)

PARTS LIST AND DESCRIPTION (Continued)

When ordering parts, state Model, Part Number, and Description

SEMICONDUCTORS (Select replacement for best results)

ITEM No.	MFG. PART No./ TYPE No.				
		NTE PART No.	ECG PART No.	TCE PART No.	NOTES
TR11	B884	NTE262	ECG262	SK3897/262	
	2SB884	NTE262	ECG262	SK3897/262	
	07108841	NTE262	ECG262	SK3897/262	
TR12	D1395	NTE2334	ECG2334	SK9475/2334	
	2SD1395	NTE2334	ECG2334	SK9475/2334	
	07313951	NTE2334	ECG2334	SK9475/2334	
TR13	C1740S	NTE85	ECG85	SK3122	
	2SC1740S	NTE85	ECG85	SK3122	
	2SC1740	NTE85	ECG85	SK3122	
	07227853	NTE85	ECG85	SK3122	
TR14	B884	NTE262	ECG262	SK3897/262	
	2SB884	NTE262	ECG262	SK3897/262	
	07108841	NTE262	ECG262	SK3897/262	
TR15	D1395	NTE2334	ECG2334	SK9475/2334	
	2SD1395	NTE2334	ECG2334	SK9475/2334	
	07313951	NTE2334	ECG2334	SK9475/2334	
TR16	C1740S	NTE85	ECG85	SK3122	
	2SC1740S	NTE85	ECG85	SK3122	
	2SC1740	NTE85	ECG85	SK3122	
	07227853	NTE85	ECG85	SK3122	
TR17	C2003K	NTE85	ECG85	SK9229/85	
	2SC2003K	NTE85	ECG85	SK9229/85	
	2SC2003	NTE85	ECG85	SK9229/85	
	07220031	NTE85	ECG85	SK9229/85	
TR18	B825	NTE197	ECG197	SK3083/197	
	2SB825	NTE197	ECG197	SK3083/197	
	07108251	NTE197	ECG197	SK3083/197	
TR19	C1740S	NTE85	ECG85	SK3122	
	2SC1740S	NTE85	ECG85	SK3122	
	2SC1740	NTE85	ECG85	SK3122	
	07227853	NTE85	ECG85	SK3122	
TR20	B884	NTE262	ECG262	SK3897/262	
	2SB884	NTE262	ECG262	SK3897/262	
	07108841	NTE262	ECG262	SK3897/262	
TR21	D1395	NTE2334	ECG2334	SK9475/2334	
	2SD1395	NTE2334	ECG2334	SK9475/2334	
	07313951	NTE2334	ECG2334	SK9475/2334	
TR22	A933S	NTE290A	ECG290A	SK9132	
	2SA933S	NTE290A	ECG290A	SK9132	
	2SA933	NTE290A	ECG290A	SK9132	
	07011752	NTE290A	ECG290A	SK9132	
TR23	C1740S	NTE85	ECG85	SK3122	
	2SC1740S	NTE85	ECG85	SK3122	
	2SC1740	NTE85	ECG85	SK3122	
	07227853	NTE85	ECG85	SK3122	
TR24	B884	NTE262	ECG262	SK3897/262	
	2SB884	NTE262	ECG262	SK3897/262	
	07108841	NTE262	ECG262	SK3897/262	

PARTS LIST AND DESCRIPTION (Continued)

When ordering parts, state Model, Part Number, and Description

SEMICONDUCTORS (Select replacement for best results)

ITEM No.	MFR. PART No./ TYPE No.				
		NTE PART No.	ECG PART No.	TCE PART No.	NOTES
TR25	D1395	NTE2334	ECG2334	SK9475/2334	VERSION 3 ONLY
	2SD1395	NTE2334	ECG2334	SK9475/2334	
	07313951	NTE2334	ECG2334	SK9475/2334	
TR26	C1740S	NTE85	ECG85	SK3122	
	2SC1740S	NTE85	ECG85	SK3122	
	2SC1740	NTE85	ECG85	SK3122	
	07227853	NTE85	ECG85	SK3122	
TR27 THRU TR29	B886	NTE264	ECG264	SK3181A/264	
	2SB886	NTE264	ECG264	SK3181A/264	
	07108861	NTE264	ECG264	SK3181A/264	
TR30	D1195	NTE261	ECG261	SK3896/261	
	2SD1195	NTE261	ECG261	SK3896/261	
	07311951	NTE261	ECG261	SK3896/261	
ZD1	RD4.3EB1	NTE5008A	ECG5008A	SK4A3/5008A	
	08020067	NTE5008A	ECG5008A	SK4A3/5008A	
ZD2	RD39FB1				
	08020059				
ZD3 THRU ZD4	RD4.7EB1	NTE5009A	ECG5009A	SK4A7/5009A	
	08020030	NTE5009A	ECG5009A	SK4A7/5009A	
ZD5	RD6.2EB3	NTE5013A	ECG5013A	SK6A2/5013A	
	08020029	NTE5013A	ECG5013A	SK6A2/5013A	
ZD6 THRU ZD10	RD24FB	NTE5081A	ECG5081A	SK24V/5081A	VERSION 3 ONLY
	08020037	NTE5081A	ECG5081A	SK24V/5081A	
ZD11	RD24FB	NTE5081A	ECG5081A	SK24V/5081A	
	08020037	NTE5081A	ECG5081A	SK24V/5081A	
	PARALLEL BUFFER BOARD				
IC1	2764-250	NTE2764	ECG2764		
	2764	NTE2764	ECG2764		
	08220033	NTE2764	ECG2764		
IC2,3	HM6264-150				
	6264				
	08220039				
IC4	74LS42	NTE74LS42	ECG74LS42	SK74LS42	VERSION 3 ONLY
	08210004	NTE74LS42	ECG74LS42	SK74LS42	
IC5	UPD7801				
	08220048				
	[uPD7801]				
IC6	M54610P				
	08200101				
	SERIAL BUFFER BOARD				
D1	1S1588	NTE519	ECG519	SK3100/519	
	08000001	NTE519	ECG519	SK3100/519	
D2,3	DS446	NTE519	ECG519	SK3100/519	VERSION 3 ONLY
	08000028	NTE519	ECG519	SK3100/519	
IC1	2764-250	NTE2764	ECG2764		
	2764	NTE2764	ECG2764		
	08220033	NTE2764	ECG2764		

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STAR

PARTS LIST AND DESCRIPTION (Continued)

When ordering parts, state Model, Part Number, and Description

SEMICONDUCTORS (Select replacement for best results)

ITEM No.	MFR. PART No./ TYPE No.				
		NTE PART No.	ECG PART No.	TCE PART No.	NOTES
IC2	74LS373	NTE74LS373	ECG74LS373	SK74LS373	
IC3	08210038 75189 08210048	NTE74LS373 NTE75189 NTE75189	ECG74LS373 ECG75189 ECG75189	SK74LS373 SK5189/75189 SK5189/75189	
IC4	HM6264-150 6264				
IC5	08220039 UPD7810H 08220073 7810H				
IC6	74LS04	NTE74LS04	ECG74LS04	SK74LS04	
IC7	08210002 74LS00 08210001	NTE74LS04 NTE74LS00 NTE74LS00	ECG74LS04 ECG74LS00 ECG74LS00	SK74LS04 SK74LS00 SK74LS00	
IC8	75188	NTE75188	ECG75188	SK5188/75188	
PC1	08210047 PS2401-2 08300032	NTE75188	ECG75188	SK5188/75188	
TR1	C2785	NTE85	ECG85	SK3124A/289A	
TR2	2SC2785 07227851 D863 2SD863 07308631	NTE85 NTE85 NTE382 NTE382 NTE382	ECG85 ECG85 ECG382 ECG382 ECG382	SK3124A/289A SK3124A/289A SK9137/382 SK9137/382 SK9137/382	
TR3	C3331	NTE293	ECG293	SK3849/293	
ZD1	2SC3331 2SC3330 07233301 RD13EB3 08020028	NTE293 NTE85 NTE85 NTE5022A NTE5022A	ECG293 ECG85 ECG85 ECG5022A ECG5022A	SK3849/293 SK9229/85 SK9229/85 SK13A/5022A SK13A/5022A	

PRINTER SELF TEST

Printer has a short and a long Self-Test. Short Self-Test prints six lines of 80-column text in Draft mode, then stops. Short test is started by loading paper and closing the cover, then holding ON LINE button down while turning Printer On. Long Self-Test prints 80-column text in Draft and Near Letter Quality modes in both Standard Roman characters and Italic characters. The long test is started by holding PAPER FEED button down while turning Printer On. The long test continues printing until Printer is turned Off.

PARTS LIST AND DESCRIPTION (Continued)

When ordering parts, state Model, Part Number, and Description

ELECTROLYTIC CAPACITORS

ITEM No.	RATING	MFGR. PART No.
C1,2 C3	<u>CONTROL BOARD</u> 10000 50V 10000 16V	05051091 05021091

Items Not Listed Are Normally Available At Local Distributors.

CAPACITORS

ITEM No.	RATING	MFGR. PART No.
C1 C2,3	<u>FUSE BOARD</u> .22 250VAC .0022 400VAC	05292243 05192223

ITEM No.	RATING	MFGR. PART No.
C49 C65 C67 CA2	<u>CONTROL BOARD</u> .0047 100V 2% .0047 100V 2% .047 100V 2% Capacitor Array 100pF X 8	05294721 05294721 05294731 05651012

Items Not Listed Are Normally Available At Local Distributors.

RESISTORS (Power and Special)

ITEM No.	RATING	REPLACEMENT DATA		
		MFGR. PART No.	NTE PART No.	
R3 R25 R45 R49 R51 R63 R65,6,7 R75 R80,1 R82 R83 R84 R85 R86 R87 R88 RA1 RA2 RA3,4 RA5 RA6 RA7	<u>CONTROL BOARD</u> 1000 5% 3W Metal Oxide 680 2% 2W Metal Oxide 59K 1% 1/6 Carbon Film 680 2% 2W Metal Oxide 510 2% 1/6W Carbon Film 59K 2% 1/6W Carbon Film 3300 2% 1W Metal Oxide 3000 2% 1/6W Carbon Film 3000 1% 1/6W Carbon Film 2700 1% 1/6W Carbon Film 3000 1% 1/6W Carbon Film 43K 2% 1/6W Carbon Film 10K 2% 1/6W Carbon Film 2000 1% Carbon Film 3000 1% 1/6W Carbon Film 680 2% 2W Metal Oxide Resistor Array 10K X 8 Resistor Array 10K X 6 Resistor Array 10K X 8 Resistor Array 2200 X 4 Resistor Array 10K X 8 Resistor Array 1000 X 9	06231023 06206811 06255931 06206811 06055115 06255931 06213321 06053024 06253021 06252724 06253021 06054334 06051035 06252021 06253021 06206811 06581032 06581034 06581032 06582221 06581032 06581022	3W210	

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PARTS LIST AND DESCRIPTION (Continued)

When ordering parts, state Model, Part Number, and Description

MISCELLANEOUS

ITEM No.	PART NAME	MFGR. PART No.	NOTES
	<u>CHASSIS</u>		
CM1	Carriage Motor		
M1	Switch		Home Position Sensor
M2	Switch		Paper End Sensor
M3	Switch		Release Lever
M4	Switch		Automatic Sheet Feeder
P1	AC Cord		Polarized
PH1	Print Head	89150010	DP8105
SW1	Switch		Power
T1	Power Transformer Fan	87277010	
	<u>CONTROL BOARD</u>		
BZ1	Buzzer	45060201	QMB-11P
DSW1,2	Switch	09090018	DIP
F1	Fuse	09990027	Versions 2,3
	3 Amp @ 125V		
	5 Amp @ 125V	09990034	Version 1
F2	Fuse	09990051	Used 220V, EC
F2	Fuse	09990037	Used 220V Except, EC
F3,4	Fuse	09990027	
	3 Amp @ 125V		
F5	Fuse	09990027	Versions 2,3
	3 Amp @ 125V		
XTAL1	Crystal		14MHz
	<u>CONTROL PANEL BOARD</u>		
LED1	LED	08300027	Power, Green
LED2	LED	08300028	PE, Red
LED3	LED	08300027	Draft, Green
LED4	LED	08300027	NLQ, Green
LED5	LED	08300027	Prop, Green
LED6	LED	08300027	80, Green
LED7	LED	08300027	96, Green
LED8	LED	08300027	137, Green
LED9	LED	08300027	On Line, Green
SW1	Switch	09051001	Form Length
SW2	Switch	09010037	Mode
SW3	Switch	09010037	Print Pitch
SW4	Switch	09010037	TOF
SW5	Switch	09010037	Paper Feed
SW6	Switch	09010037	On Line
SW8	Switch	09040011	Cover Open Detector
	<u>FUSE BOARD</u>		
F1	Fuse	09990037	
	5 Amp @ 125V		
	4 Amp @ 250V	09990047	220V/240V Model
L1	Line Filter (1.3mH)	09251103	
	<u>PARALLEL BUFFER BOARD</u>		
X-TAL	Crystal	09250010	4MHz
	<u>SERIAL BUFFER BOARD</u>		
DSW1	Switch	09090018	DIP
L1 thru L5	Ferrite Bead	09990706	
T1	Transformer	09240030	
X-TAL1	Ceramic Oscillator	09250016	7.37MHz

Connector Signals and Functional Description Parallel Interface (Optional)

Pin No.	Signal Name	Direction	Function
1	STROBE	IN	Signals when data is ready to be read. Signal goes from HIGH to LOW (for at least 0.5 microseconds) when data is available.
2	DATA1	IN	These signals provide the information of the first to eighth bits of parallel data. Each signal is at HIGH level for a logical 1 and at a LOW level for a logical 0.
3	DATA2	IN	
4	DATA3	IN	
5	DATA4	IN	
6	DATA5	IN	
7	DATA6	IN	
8	DATA7	IN	
9	DATA8	IN	
10	ACK	OUT	A LOW pulse acknowledges receipt of data.
11	BUSY	OUT	When this signal goes LOW the printer is ready to accept data.
12	PAPER END	OUT	This signal is normally LOW. It will go HIGH if the printer runs out of paper. This signal can be held LOW permanently by turning DIP switch 1-1 off.
13	SELECTED	OUT	This signal is HIGH when the printer is on-line.
14-15	N/C		Unused
16	SIGNAL GND		Signal ground.
17	CHASSIS GND		Printer's chassis ground, isolated from logic ground.
18	+ 5VDC	OUT	External supply of + 5VDC.
19-30	GND		Twisted pair return signal ground level.
31	RESET	IN	When this signal goes LOW the printer is reset to its power-on condition.
32	ERROR	OUT	This signal is normally HIGH. This signal goes LOW to signal that the printer cannot print due to an error condition.
33	EXT GND		External ground.
34-35	N/C		Unused.
36	SELECT IN	IN	Data entry to the printer is possible only when this level is LOW.

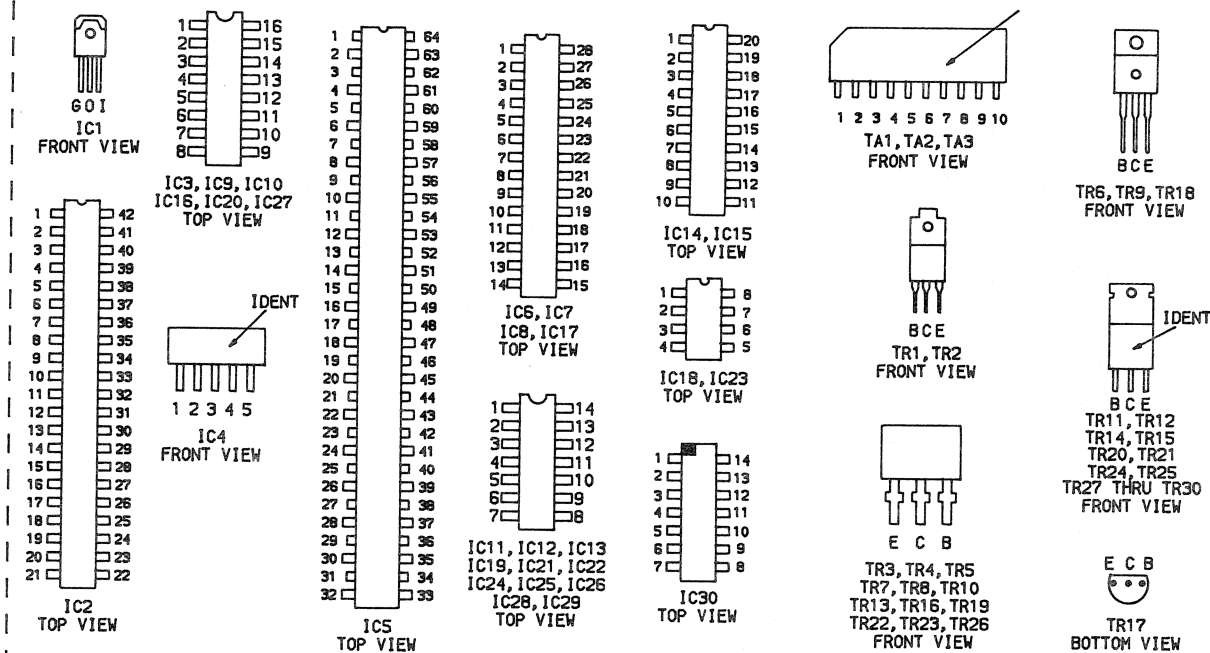
Connector Signals and Functional Descriptions Serial interface (Optional)

Pin No.	Signal Name	Direction	Function
1	GND	-	Printer's chassis ground.
2	TXD	OUT	This pin carries data from the printer.
3	RXD	IN	This pin carries data to the printer.
4	RTS	OUT	This is Space when the printer is ready to receive data.
5	CTS	IN	This pin is Space when the computer is ready to send data.
6	DSR	IN	This pin is Space when the computer is ready to send data. This printer does not check this pin.
7	GND	-	Signal ground.
8	DCD	IN	This pin is Space when the computer is ready to send data. This printer does not check this pin.
9	TTY TXDR	-	This pin is the return path for data transmitted from the printer on the 20mA current loop.
10	TTY TXD	OUT	This pin carries data from the printer on the 20mA current loop.
11	RCH	OUT	This is the signal line for the serial busy protocols. This pin goes Mark when printer's buffer fills, and Space when the printer is ready to receive data. In the busy protocols this line carries the same signal as pin 20.
12	N/C		Unused.
13	GND	-	Signal ground.
14-16	N/C		Unused.
17	TTY TXDR	-	This pin is the return path for data transmitted from the printer on the 20mA current loop.
18	TTY RXDR	-	This pin is the return path for data transmitted to the printer on the 20mA current loop.
19	TTY RXD	IN	This pin carries data to the printer on the 20mA current loop.
20	DTR	OUT	The printer turns this pin Space when it is ready to receive data.
21-22	N/C		Unused.
23	TTY RXDR	-	This pin is the return path for data transmitted to the printer on the 20mA current loop.
24	TTY TXD	OUT	This pin carries data from the printer on the 20mA current loop.
25	TTY RXD	IN	This pin carries data to the printer on the 20mA current loop.

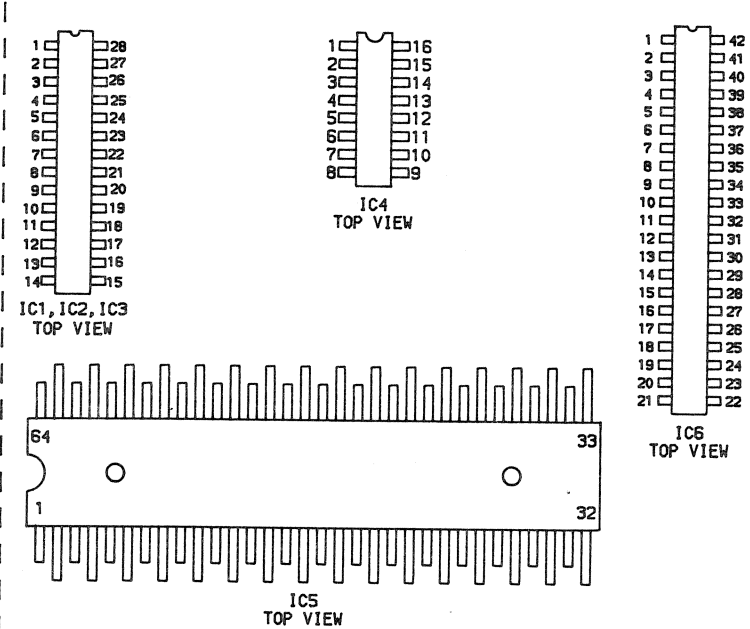
Courtesy of Manufacturer

TERMINAL GUIDES

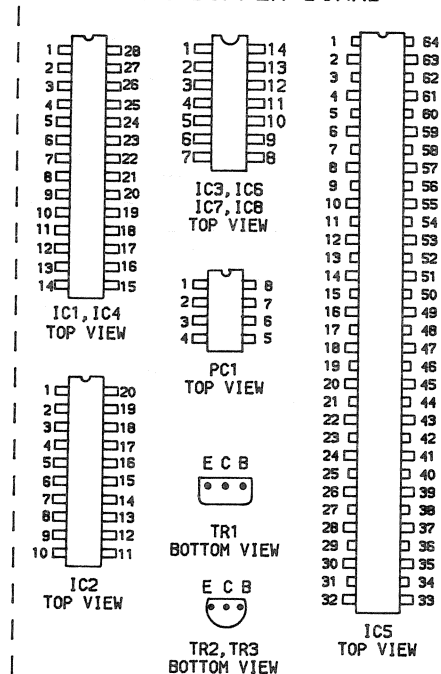
CONTROL BOARD



PARALLEL BUFFER BOARD



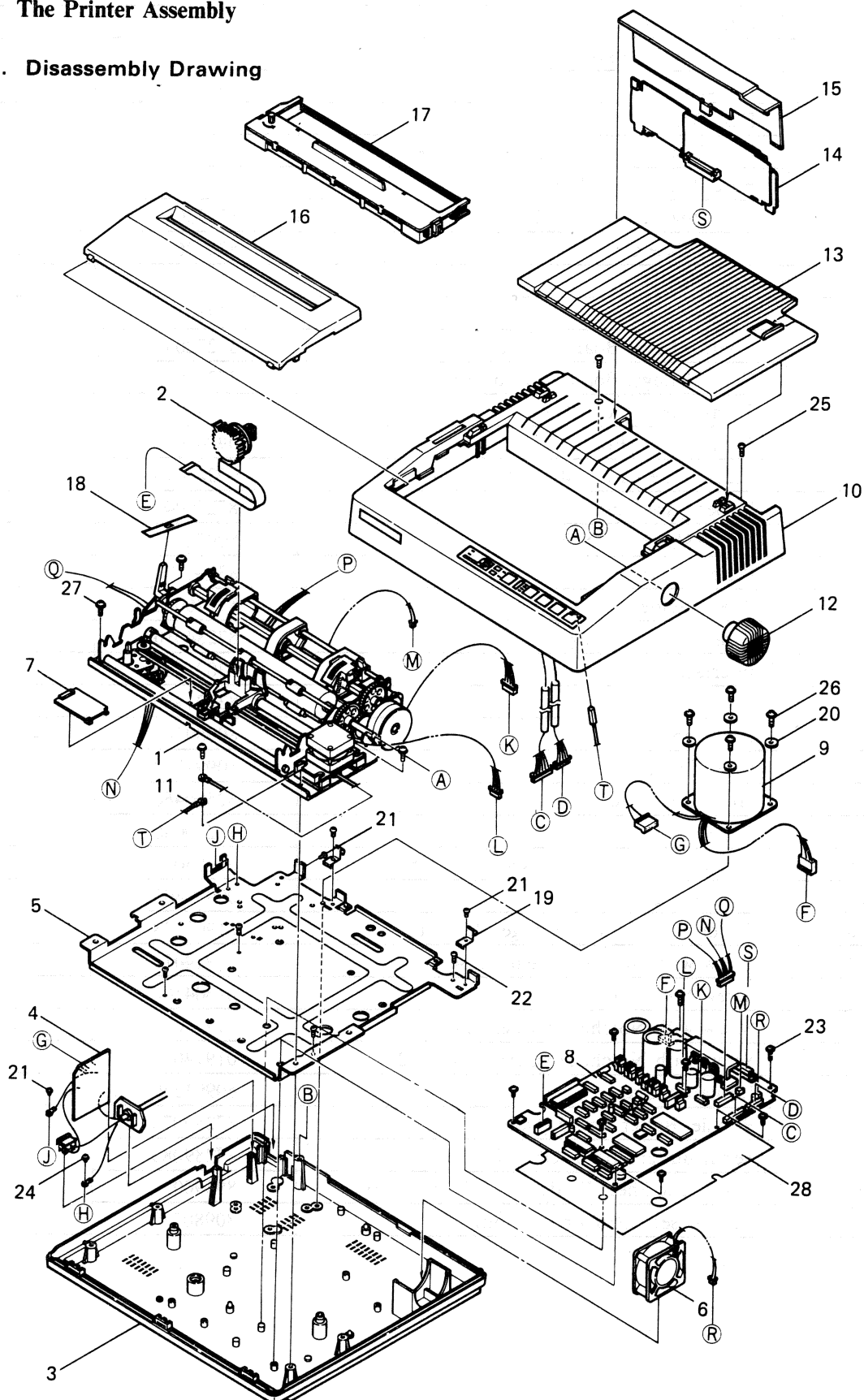
SERIAL BUFFER BOARD



1. NR-10 Printer

1-1. The Printer Assembly

1-1-1. Disassembly Drawing



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Courtesy of Manufacturer

1-1-2. Parts List

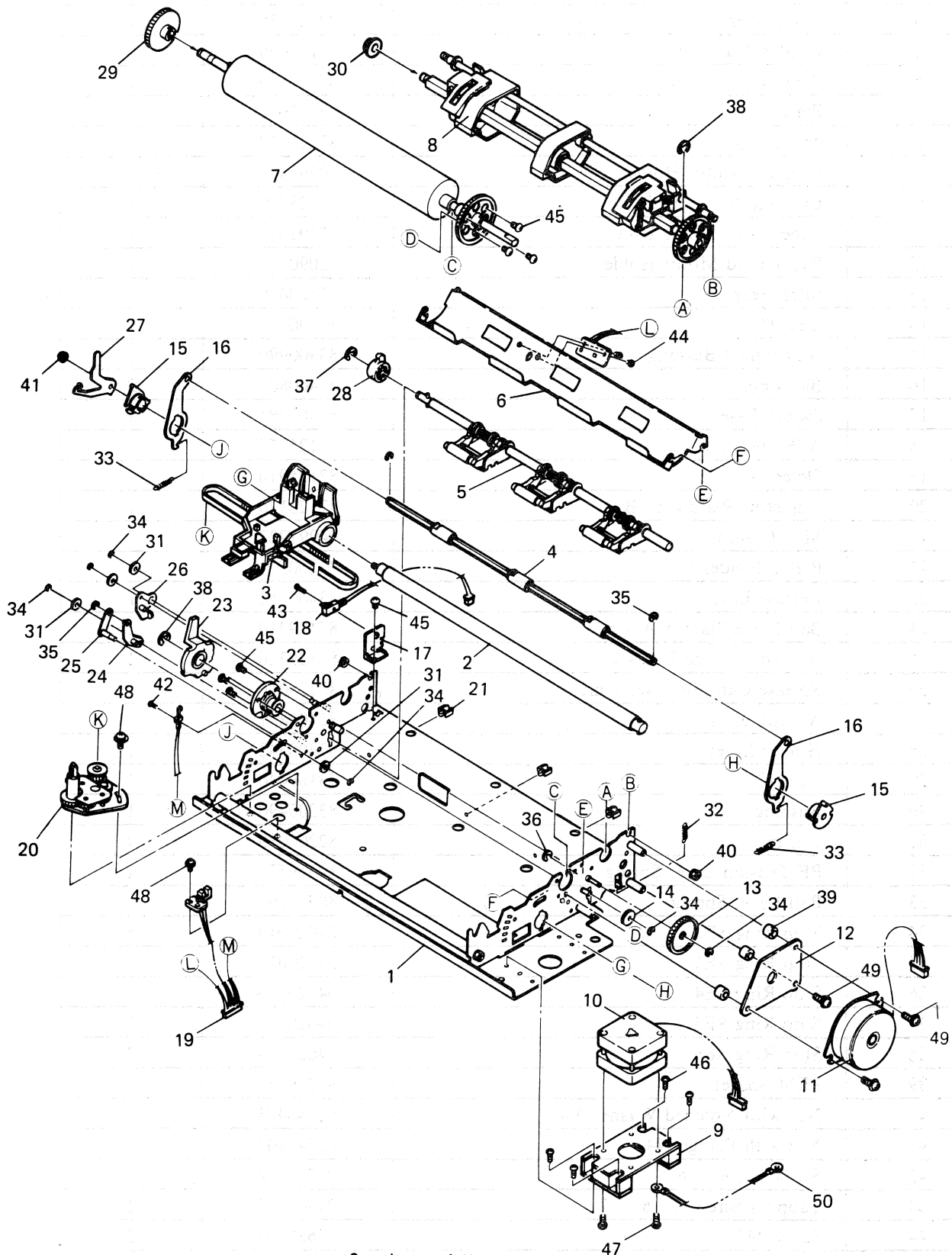
Printer NR-10

Drwg. No.	Parts Name	Parts No.	Q'ty
1	Printer Mechanism DP811	89122010	1
2	Print Head DP8101	89150020	1
3	Lower Case	83022740	1
4	Fuse Board Unit (For 120V)	87273020	1
	Fuse Board Unit (For 220V, Hong Kong)	87273040	
	Fuse Board Unit (For 220V, EC)	87273130	
	Fuse Board Unit (For 240V, without Plug)	87273050	
5	Lower Case Chassis	82010620	1
6	Fan Unit	87277010	1
7	Connector Cover	83910810	1
8	Control Logic Board (For 220V, EC)	87272040	1
	Control Logic Board (Except for 220V, EC)	87272020	
9	Transformer (For 120V)	09240075	1
	Transformer (For 220V)	09240071	
	Transformer (For 240V)	09240073	
10	Upper Case Unit	87270040	1
11	Wire 18UL2.13GN/Y60TS	80924270	1
12	Platen Knob	83901171	1
13	Paper Guide	87276020	1
14	Parallel Interface Board	87284010	1
15	Interface Cover	83021880	1
16	Printer Cover	83021860	1
17	Ink Ribbon Cartridge	80980361	1
18	Lever Sheet	80991242	1
19	Ground Contact Plate	82500460	2
20	Collar	82200080	4
21	Screw with Notched Washer M3 × 5	01903026	4
22	Tapping Screw M3 × 8	00930803	4
23	Tapping Screw with Flange M3 × 10	01903038	8
24	Screw with Notched Washer M4 × 5	01914014	1
25	Screw M4 × 10	01604100	2
26	Screw with Notched Washer M4 × 10	01914021	4
27	Screw with Notched Washer M4 × 12	01914010	4
28	Insulation Sheet	80991530	1
	Parallel Buffer Board (Option)	87289070	1
	Serial Buffer Board (Option)	87289080	
	Automatic Sheet Feeder SF-10D (Option)	89590010	
	Sub-Cassette Ribbon (Option)	80980380	

Courtesy of Manufacturer

1-2. Printer Mechanism DP811

1-2-1. Disassembly Drawing



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1-2-2. Parts List
Printer Mechanism DP811

Drwg. No.	Parts Name	Parts No.	Q'ty
1	Frame Unit	87120060	1
2	Carriage Stay (1) Unit	87127010	1
3	Carriage Unit	87122080	1
4	Bail Roller Unit	87127030	1
5	Holder Shaft Unit	87127020	1
6	Paper Chute Unit	87124010	1
7	Platen Unit	87123010	1
8	Tractor Unit	87126010	1
9	Carriage Motor Holder	80991440	1
10	Carriage Motor Unit	87128360	1
11	Paper Feed Motor Unit	87101020	1
12	Paper Feed Motor Holder	82090560	1
13	Idler Gear	83100420	1
14	Gear (1)	83100110	1
15	Adjustment Bushing	83900990	2
16	Bail Lever	82400801	2
17	Switch Base	83901081	1
18	ASF Detector	87125350	1
19	Detector Unit	87125910	1
20	Adjusting Plate Unit B	87128120	1
21	Mini Clamp	04991222	3
22	Platen Holder L	83200521	1
23	Release Lever	83400361	1
24	Bail Drive Plate A Ass'y	87129310	1
25	Bail Drive Plate B Ass'y	87129320	1
26	Release Cam Follower Unit	87129010	1
27	Adjustment Lever	82400891	1
28	Holder Lever	83400342	1
29	Gear (2)	83100440	1
30	Bushing	83200490	1
31	Collar	82200010	4
32	PF Tension Lever Spring	80510570	1
33	Bail Lever Spring	80510590	2
34	Stop Ring SE2	04020010	6
35	Stop Ring SE3	04020015	3
36	Stop Ring SE4	04020016	1
37	Stop Ring SE5	04020017	1
38	Stop Ring SE6	04020014	2
39	PEM Spacer	81220150	3
40	Nut with Notched Washer N4	02040403	2
41	Nut with Flange N4	02040402	1
42	Screw M1.6 × 6	00716604	1
43	Tapping Screw M1.6 × 7	01901602	1
44	Screw M3 × 3	00630304	2

Courtesy of Manufacturer

Drwg. No.	Parts Name	Parts No.	Q'ty
45	Screw M3 × 4	00630404	7
46	Screw M3 × 5	00630504	4
47	Screw M3 × 6	00830604	2
48	Screw with Spring Washer M3 × 6	01903018	2
49	Screw with Flange M3 × 10	01903035	3
50	Wire 18UL2.13G/Y80	80822020	1
—	Fastener	04991204	3

SERIAL INTERFACE BOARD

4-3. DIP Switch Settings

Table 1-3. DIP switch on serial board

Switch	ON	OFF
1	7 data bits	8 data bits
2	Parity checked	No parity
3	Handshaking protocols – see Table 1-4	
4		
5	Odd parity	Even parity
6	Data transfer rate – see Table 1-5.	
7		
8		

Table 1-4. Handshaking protocols

Protocol	Switch 3	Switch 4
Serial busy, 1 byte mode	OFF	OFF
Serial busy, 1 block mode	ON	OFF
ACK mode	OFF	ON
XON/XOFF mode	ON	ON

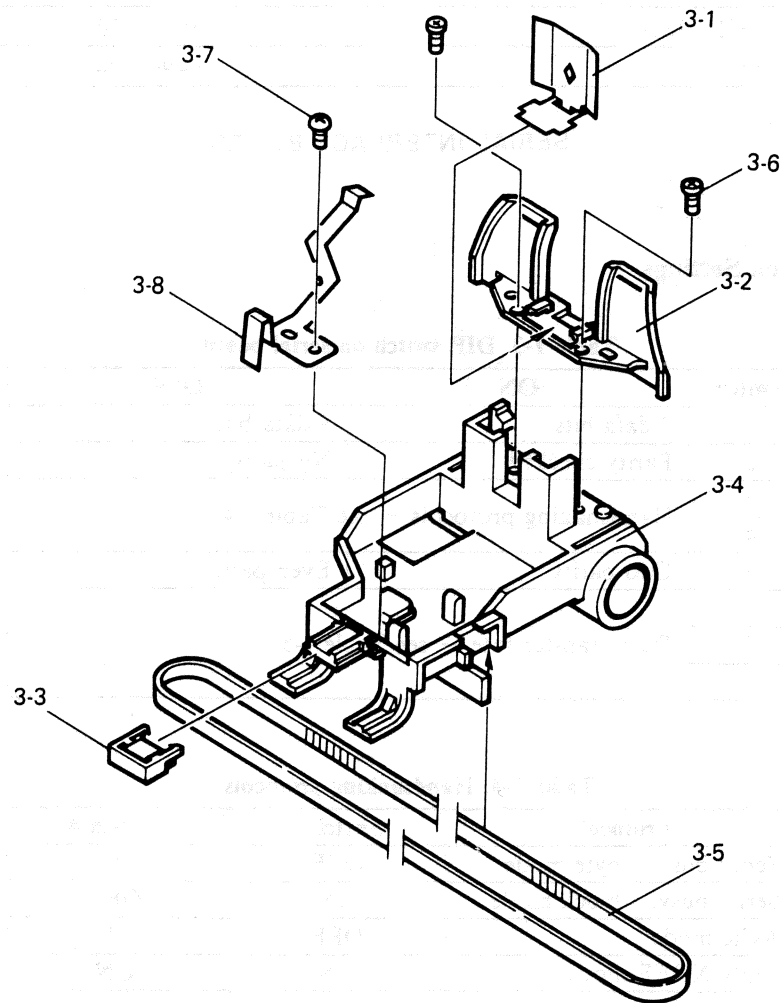
Table 1-5. Data transfer rates

Baud rate	Switch 6	Switch 7	Switch 8
150	OFF	OFF	OFF
300	OFF	OFF	ON
600	OFF	ON	OFF
1200	OFF	ON	ON
2400	ON	OFF	OFF
4800	ON	OFF	ON
9600	ON	ON	OFF
19200	ON	ON	ON

Courtesy of Manufacturer

1-3. Sub-Assembly

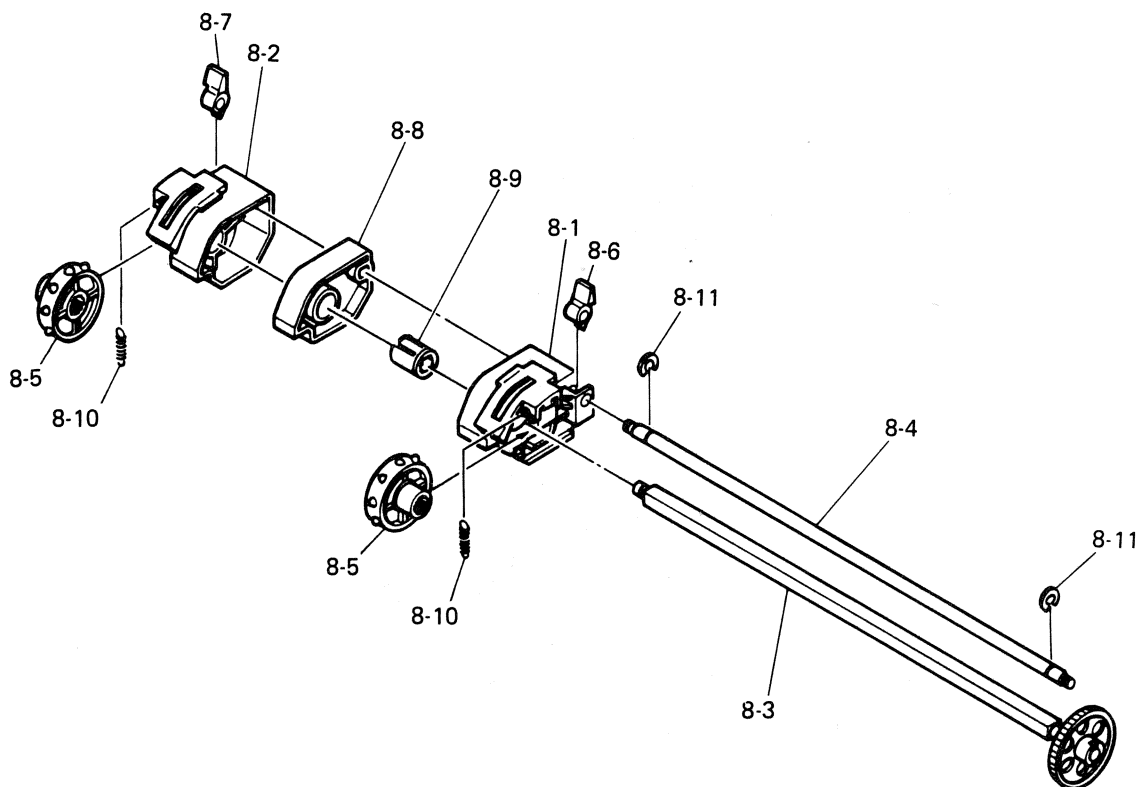
1-3-1. Carriage Unit



Drwg. No.	Parts Name	Parts No.	Q'ty
3-1	Ribbon Guide	82900571	1
3-2	Card Holder	83901041	1
3-3	Rear Slider	83901020	1
3-4	Carriage Ass'y	87122330	1
3-5	Timing Belt	80902040	1
3-6	Tapping Screw M2.6 x 5	01902609	2
3-7	Tapping Screw M2 x 4	01902028	1
3-8	Ground Plate B	82500750	1

Courtesy of Manufacturer

1-3-2. Tractor Unit

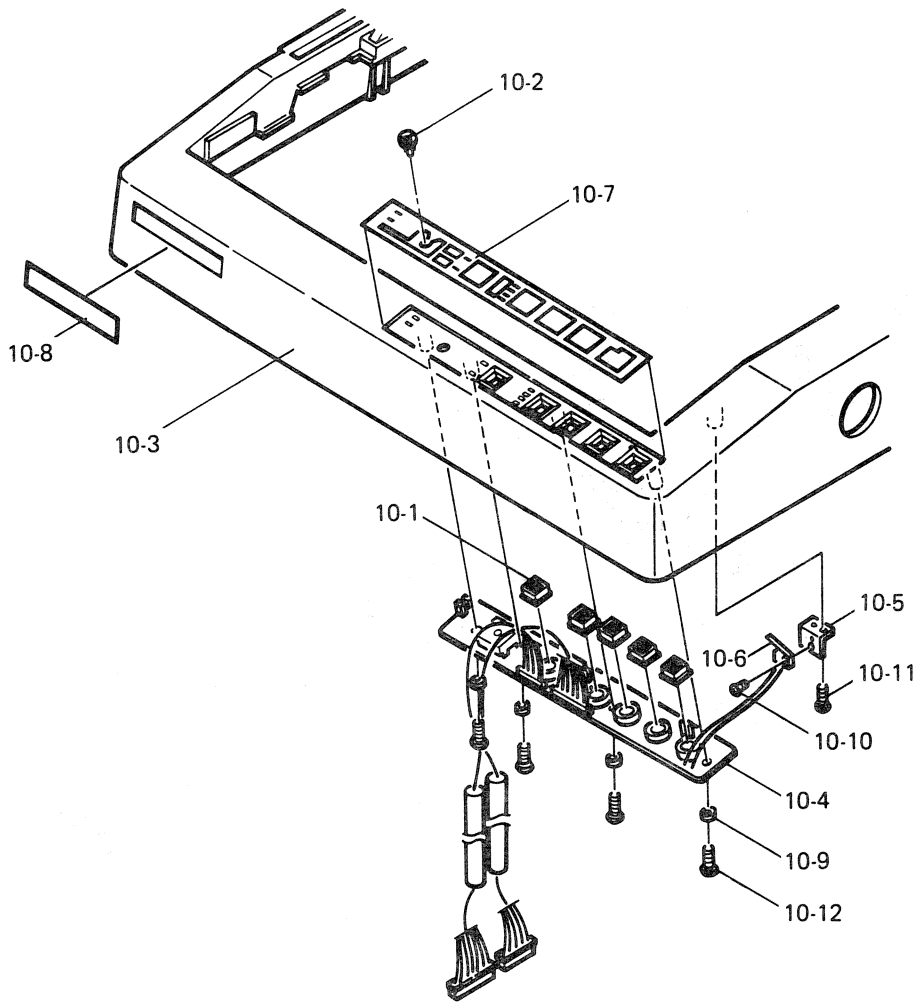


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Drwg. No.	Parts Name	Parts No.	Q'ty
8-1	Tractor R Ass'y (Includes Drwg. No. 8-5, 10)	87126310	1
8-2	Tractor L Ass'y (Includes Drwg. No. 8-5, 10)	87126320	1
8-3	Tractor Shaft Ass'y	87126330	1
8-4	Tractor Stay	81370402	1
8-5	Sprocket Wheel	83120301	2
8-6	Clamp Lever R	83400311	1
8-7	Clamp Lever L	83400321	1
8-8	Sheet Guide	83901000	1
8-9	Sheet Guide Bushing	83200150	1
8-10	Tractor Spring	80510551	2
8-11	Stop Ring SE5	04020017	2

Courtesy of Manufacturer

1-3-3. Upper Case Unit



Drwg. No.	Parts Name	Parts No.	Q'ty
10-1	Switch Actuator	83900600	5
10-2	Switch Knob	83200570	1
10-3	Upper Case	83021840	1
10-4	Control Panel Board (Includes Drwg. No.10-5, 6, 10)	87270320	1
10-5	Switch Fitting	82090692	1
10-6	Cover Open Detector	09040011	1
10-7	Operation Sheet	80085350	1
10-8	Brand Name Plate	80080500	1
10-9	Board Bushing	83200550	4
10-10	Screw M1.6 × 6	00716604	1
10-11	Tapping Screw M3 × 8	00930803	1
10-12	Tapping Screw M3 × 12	01903047	4

Courtesy of Manufacturer

SCHEMATIC NOTES

- Circuitry not used in some versions
- Circuitry used in some versions
- See parts list
- + Ground
- ~ Chassis
- ▽ Common tie point

Waveforms and voltages taken from ground, unless noted otherwise.

Item numbers in rectangles appear in the alignment/adjustment instructions.

Resistors are 1/2W or less, 5% or greater, unless noted.

Value in () used in some versions.

Measurements with switching as shown, unless noted.

Supply voltage maintained as shown at input.

Voltages measured with digital meter.

Logic Probe Display

- L = Low
- H = High
- P = Pulse
- * = Open (no lights On)

Logic Probe Indicates:

- (1) L during Line Feed.
- (2) H during Line Feed.
- (3) P during Line Feed.
- (9) P when Printer is On Line.
- (10) L when Carriage Assembly is in Home position.

Controls adjusted for normal operation.

Terminal identification may not be found on unit.

Capacitors are 50 volts or less, 5% or greater, unless noted.

Electrolytic Capacitors are 50 volts or less, 5% or greater, unless noted.

Waveforms taken with triggered scope and Sweep/Time switch in Calibrate position, scope input set for DC coupling on 0 reference voltage waveforms. Switch to AC input to view waveforms after DC reference is measured when necessary. Each waveform is 10cm. width with DC reference voltage given at the bottom line of each waveform. Readings taken during "Long Self Test" (See General Operating Instructions) unless otherwise noted.

- (11) H when Carriage Assembly is in Home position.
- (21) Changes state when next phase of paper feed is activated.
- (22) H when carriage active and head inactive.
- (23) P when printhead active.
- (24) L when carriage moves Left, H when carriage moves Right.
- (25) P during second pass of first NLQ line and both passes of remaining NLQ.
- (26) P during one of two passes per NLQ line.
- (27) H during draft quality.
- (28) L during draft quality.

LINE DEFINITIONS

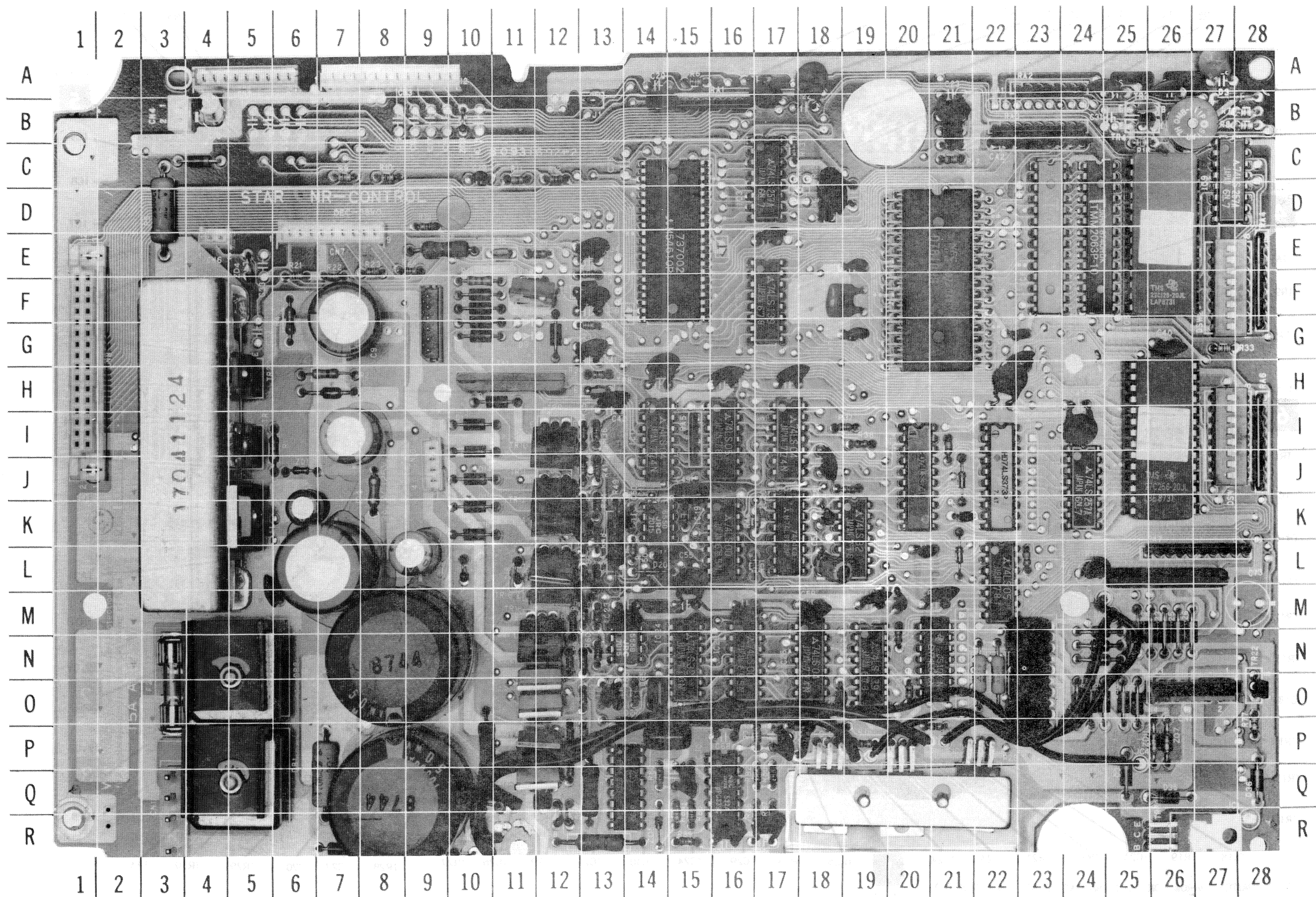
A0 THRU A15 ADDRESS BITS 0 THRU 15
ACK ACKNOWLEDGE
AN4 ONLINE SWITCH STATUS
AN5 COVER OPEN SWITCH STATUS
BUSY BUSY
C-BUSY BUSY
CE22 CHIP ENABLE
CK CLOCK TIMING PULSE
CLR CLEAR
CS1 CHIP SELECT
CS2IN CHIP SELECT 2 INPUT
CS2OUT CHIP SELECT 2 OUTPUT
CTS CLEAR TO SEND
DO THRU D7 DATA BITS 0 THRU 7
DATA 1 THRU DATA 8 DATA BITS 1 THRU 8
DATA1 THRU DATA8 DATA BITS 1 THRU 8
DI 1 THRU D18 DATA BITS 1 THRU 8
DOUT DATA OUT
DTR DATA TRANSMIT READY
ERR ERROR
ERROR ERROR
FWR WRITE
IN-PRIME INPUT PRIME, CLEARS MEMORY
INPUT PRIME INPUT PRIME, CLEARS MEMORY
NMI NON-MASKABLE INTERRUPT
ONLINE ON LINE

PA1 THRU PA7 PORT A BITS 1 THRU 7
PAPER END PAPER END SENSOR
PB0 THRU PB4 PORT B BITS 0 THRU 4
PB6 PORT B BIT 6
PB7 PORT B BIT 7
PC0 PORT C BIT 0
PC4 PORT C BIT 4
PC6 PORT C BIT 6
PC7 PORT C BIT 7
PE PAPER EMPTY SENSOR
RD READ
RD/OE READ/OUTPUT ENABLE
RES RESET
RESET RESET
RTS READY TO SEND
RXD RECEIVE DATA
SEL-IN SELECT INPUT
SELECT-IN SELECT INPUT
SELECTED PRINTER ON LINE STATE IN EFFECT
SLCT SELECT
STB STROBE
STROBE STROBE PULSE FOR READY IN DATA
TXD TRANSMIT
TXDR TRANSMIT DATA
WR WRITE
WR/WE WRITE/WRITE ENABLE

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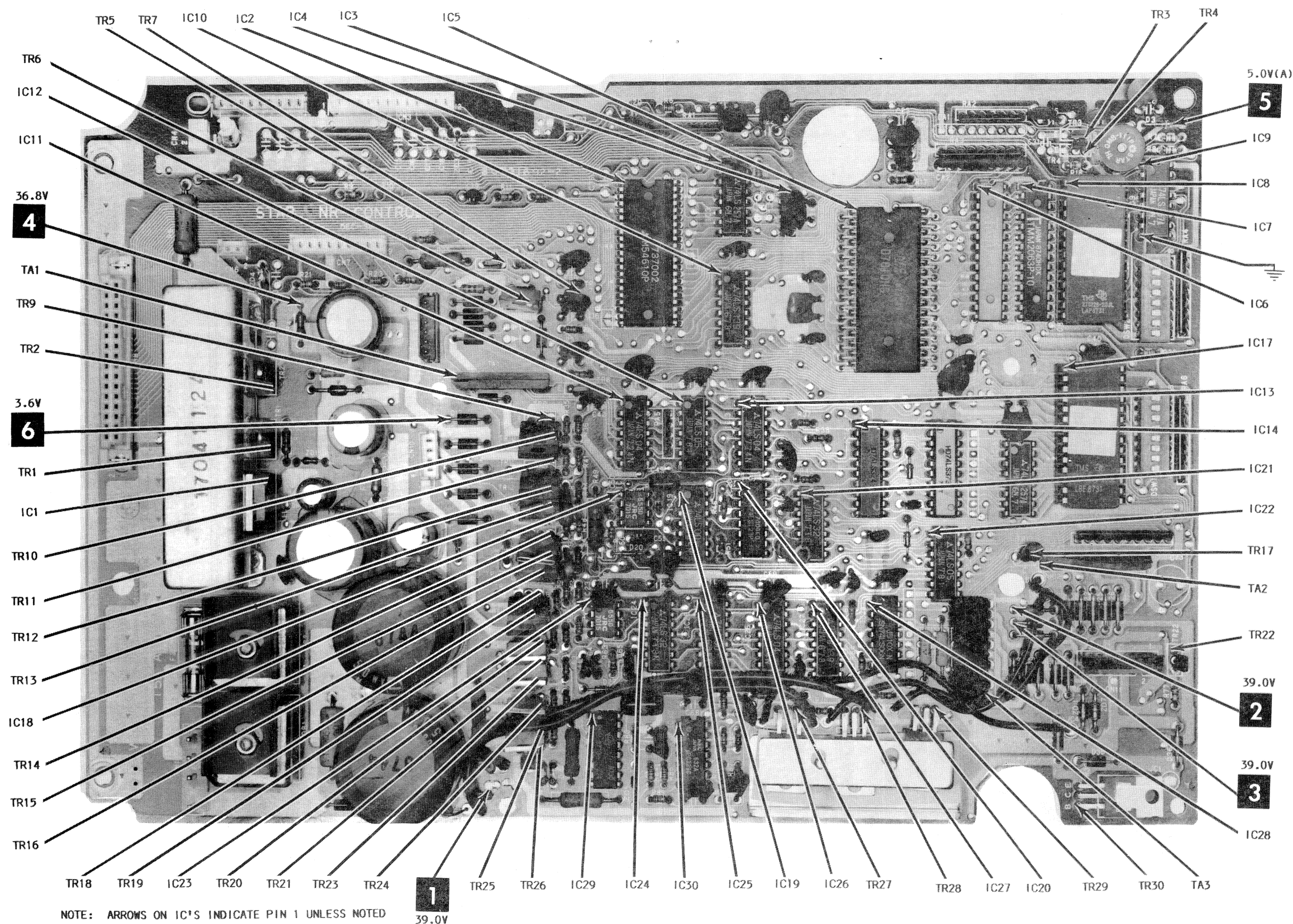
CONTROL BOARD-GridTrace LOCATION GUIDE

BZ	B-26	D3	B-28	R1	I-6	R79	Q-13
C1	Q-8	D4	F-10	R2	H-7	R80	Q-14
C2	N-8	D5	F-10	R3	Q-7	R81	Q-15
C3	L-7	D6	F-10	R4	F-6	R82	Q-17
C4	L-5	D7	G-10	R5	D-3	R83	Q-17
C6	K-6	D10	G-12	R6	A-15	R84	R-15
C7	I-7	D11	H-11	R7	B-28	R85	R-15
C8	L-9	D12	I-10	R8	B-28	R86	R-17
C9	G-7	D13	I-10	R9	C-7	R87	R-17
C10	B-4	D14	J-10	R10	C-8	R88	R-13
C20	A-14	D15	K-10	R11	C-11	R89	R-15
C21	A-17	D16	K-10	R12	C-12	RA1	B-16
C22	B-18	D17	L-10	R13	C-17	RA2	A-23
C23	B-21	D18	L-11	R16	C-21	RA3	B-22
C24	B-21	D19	J-21	R17	C-21	RA4	E-28
C25	B-21	D20	L-14	R18	C-25	RA5	I-15
C26	A-25	D21	L-21	R19	D-9	RA6	I-28
C27	A-26	D22	N-26	R21	E-6	RA7	L-26
C28	A-27	D23	N-26	R22	E-7	TA1	H-11
C29	C-10	D24	N-25	R23	E-8	TA2	L-25
C30	D-19	D25	N-26	R24	E-9	TA3	N-23
C34	E-13	D26	N-26	R25	E-9	TR1	I-5
C35	E-17	D27	P-14	R26	F-10	TR2	H-5
C36	F-13	D28	O-24	R27	E-12	TR3	B-25
C37	E-19	D29	O-24	R28	F-11	TR4	B-25
C38	G-19	D30	O-25	R29	E-13	TR5	E-11
C39	G-23	D31	O-25	R30	E-13	TR6	F-11
C40	G-26	D32	Q-25	R31	G-13	TR7	F-13
C41	G-13	D33	R-12	R32	G-13	TR8	H-13
C42	H-13	D34	R-12	R33	G-27	TR9	I-12
C43	H-14	D35	Q-26	R34	H-13	TR10	I-12
C44	H-16	D36	Q-28	R35	I-13	TR11	J-12
C45	H-17	DB1	Q-5	R36	I-13	TR12	K-12
C46	H-22	DB2	N-5	R37	I-19	TR13	K-12
C47	I-24	DSW1	J-27	R38	I-19	TR14	L-12
C48	J-18	DSW2	F-27	R39	I-21	TR15	L-12
C49	J-15	F1	R-10	R40	J-13	TR16	M-12
C50	K-14	F2	O-3	R41	J-13	TR17	L-24
C51	K-18	F3	Q-11	R42	J-19	TR18	M-12
C52	L-18	F4	J-8	R43	K-13	TR19	N-12
C53	L-20	F5	R-10	R44	K-13	TR20	N-12
C55	L-14	IC1	K-5	R45	K-15	TR21	O-3
C56	M-14	IC2	D-15	R46	K-17	TR22	O-28
C57	M-15	IC3	C-17	R47	K-13	TR23	O-3
C58	M-16	IC4	D-18	R48	K-13	TR24	P-12
C59	M-18	IC5	E-21	R49	K-13	TR25	Q-12
C60	M-19	IC6	D-23	R50	L-14	TR26	Q-12
C61	M-20	IC7	D-24	R51	L-17	TR27	Q-18
C62	M-21	IC8	D-26	R52	L-23	TR28	Q-20
C63	O-13	IC9	D-27	R53	L-13	TR29	Q-22
C64	O-13	IC10	F-17	R54	L-13	TR30	R-26
C65	O-14	IC11	I-14	R55	M-12	ZD1	J-6
C66	O-18	IC12	I-16	R56	M-13	ZD2	H-7
C67	P-14	IC13	I-17	R57	M-13	ZD3	B-10
C68	P-16	IC14	I-20	R58	N-12	ZD4	E-5
C69	P-17	IC15	I-22	R59	N-13	ZD5	R-14
C70	Q-15	IC16	J-24	R60	N-13	ZD6	O-24
C71	R-16	IC17	I-26	R61	N-20	ZD7	P-26
C72	R-17	IC18	K-14	R62	O-13	ZD8	N-24
C74	G-23	IC19	K-16	R63	O-14	ZD9	N-24
C75	K-21	IC20	K-17	R64	O-20	ZD10	N-24
CA2	C-22	IC21	K-19	R65	O-22	ZD11	P-26
CN1	Q-3	IC22	M-19	R66	O-22		
CN2	A-5	IC23	N-13	R67	N-23		
CN3	A-8	IC24	N-15	R68	P-10		
CN4	B-3	IC25	N-16	R69	P-12		
CN6	E-4	IC26	N-18	R70	P-13		
CN7	E-7	IC27	N-19	R72	P-18		
CN8	G-1	IC28	N-21	R73	P-18		
CN9	G-9	IC29	Q-14	R74	P-21		
CN10	J-9	IC30	Q-16	R75	P-17		
CN11	O-26	J1	B-13	R76	P-19		
D1	R-7	J2	F-14	R77	P-28		
D2	C-4	J3	E-16	R78	Q-12		



CONTROL BOARD

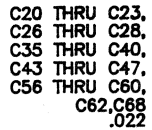
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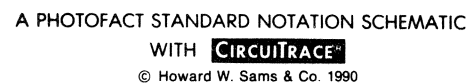
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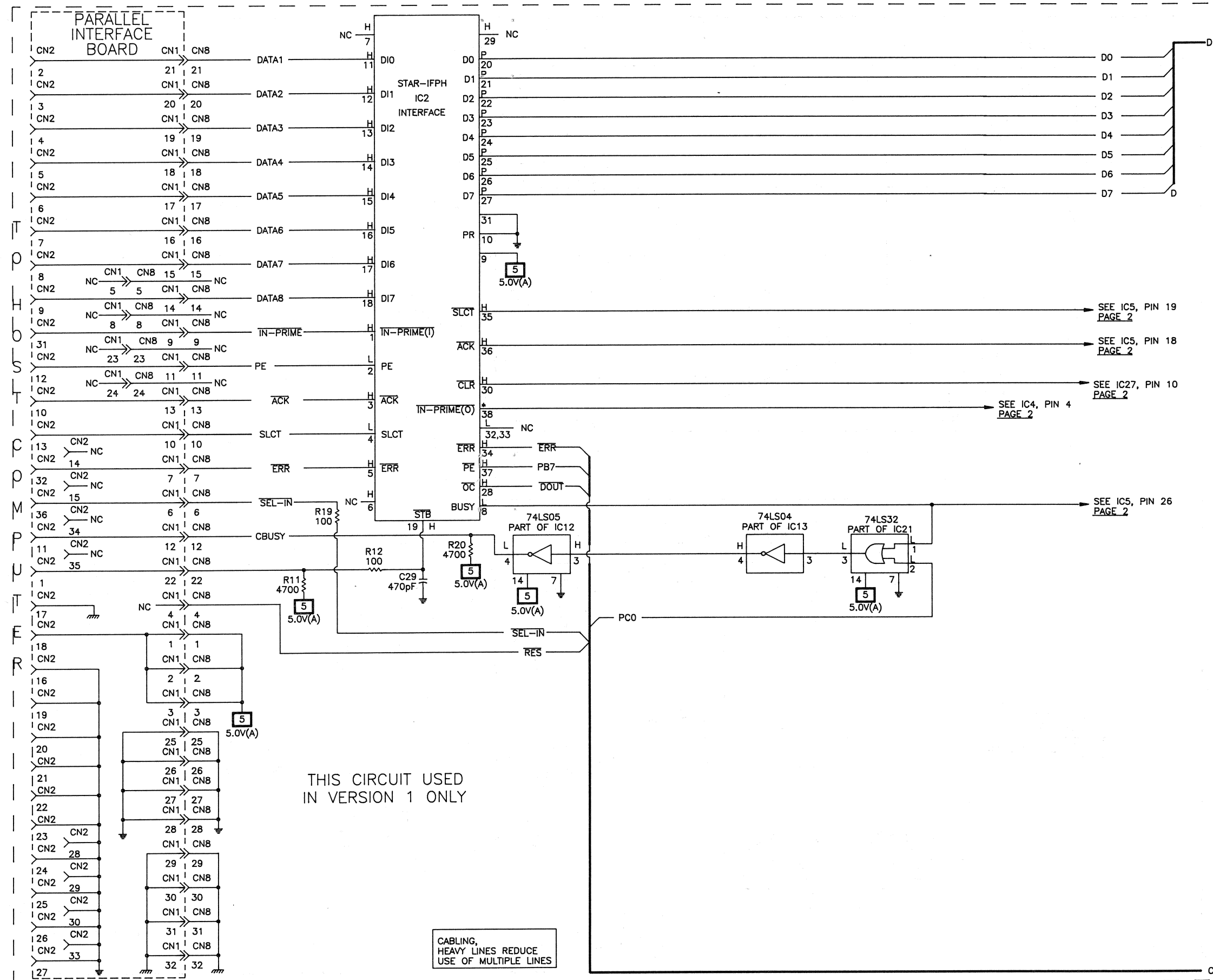
A Howard W. Sams CIRCUITRACE Photo

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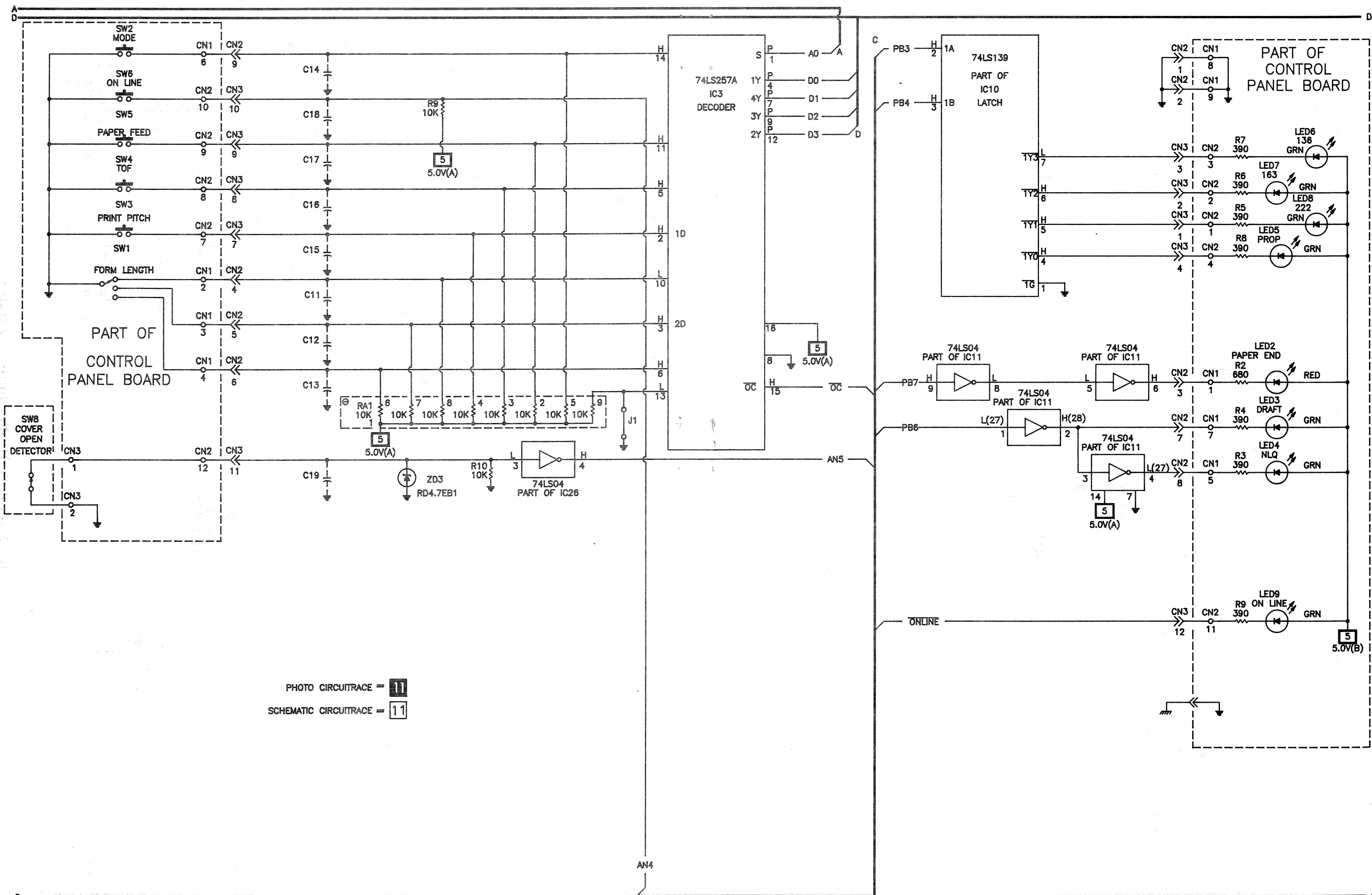


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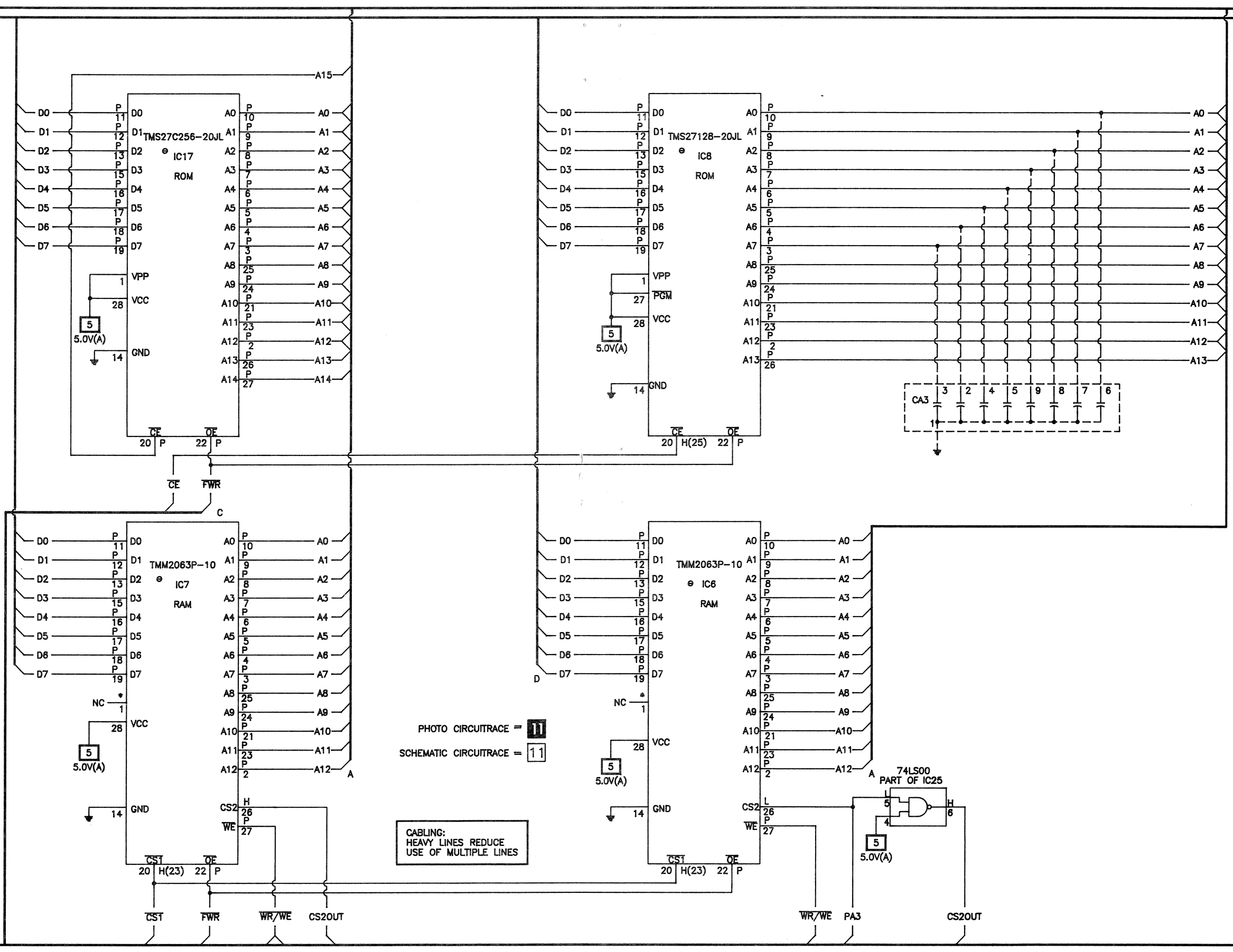








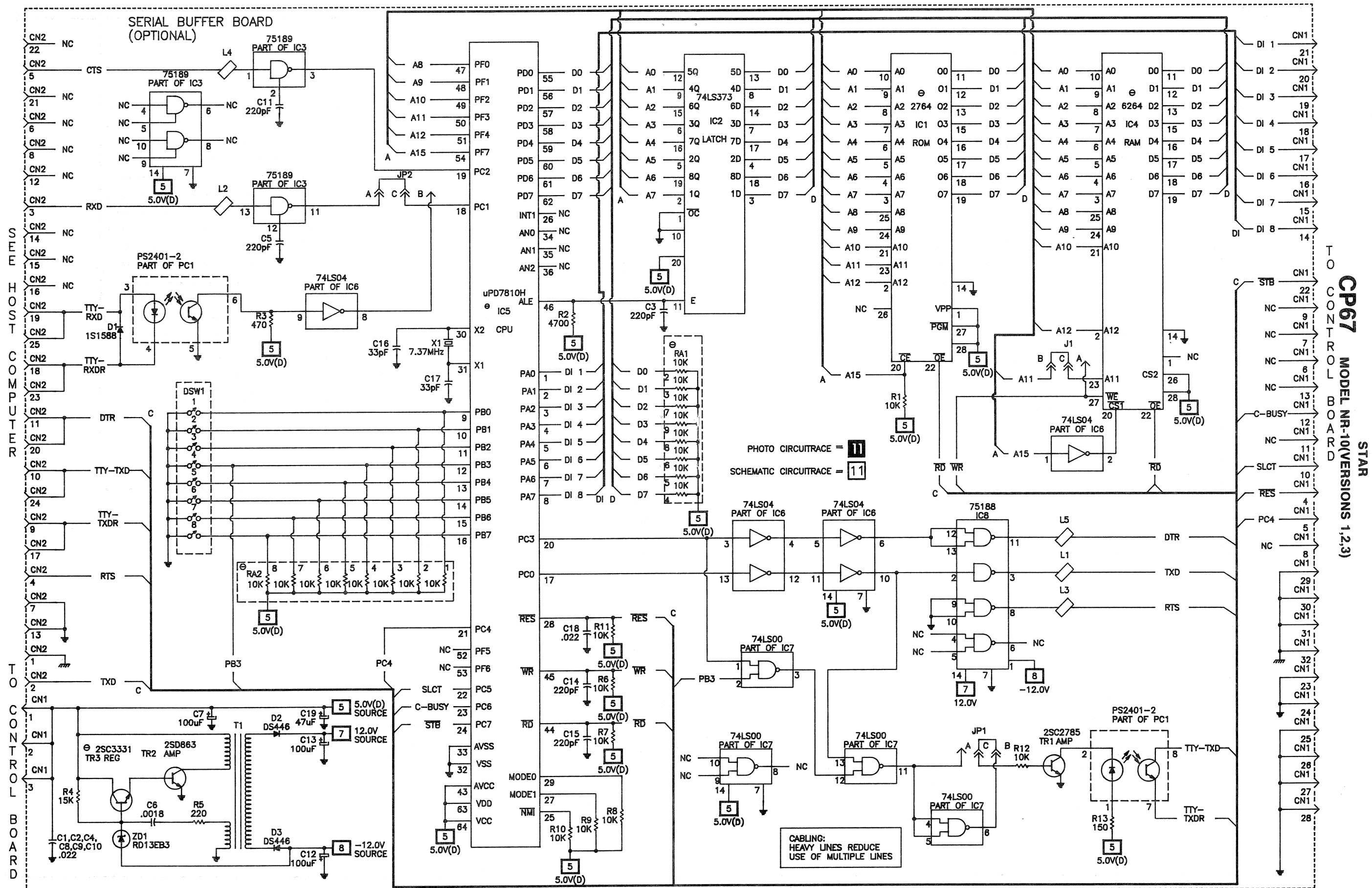
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WITH **CIRCUITRACE**

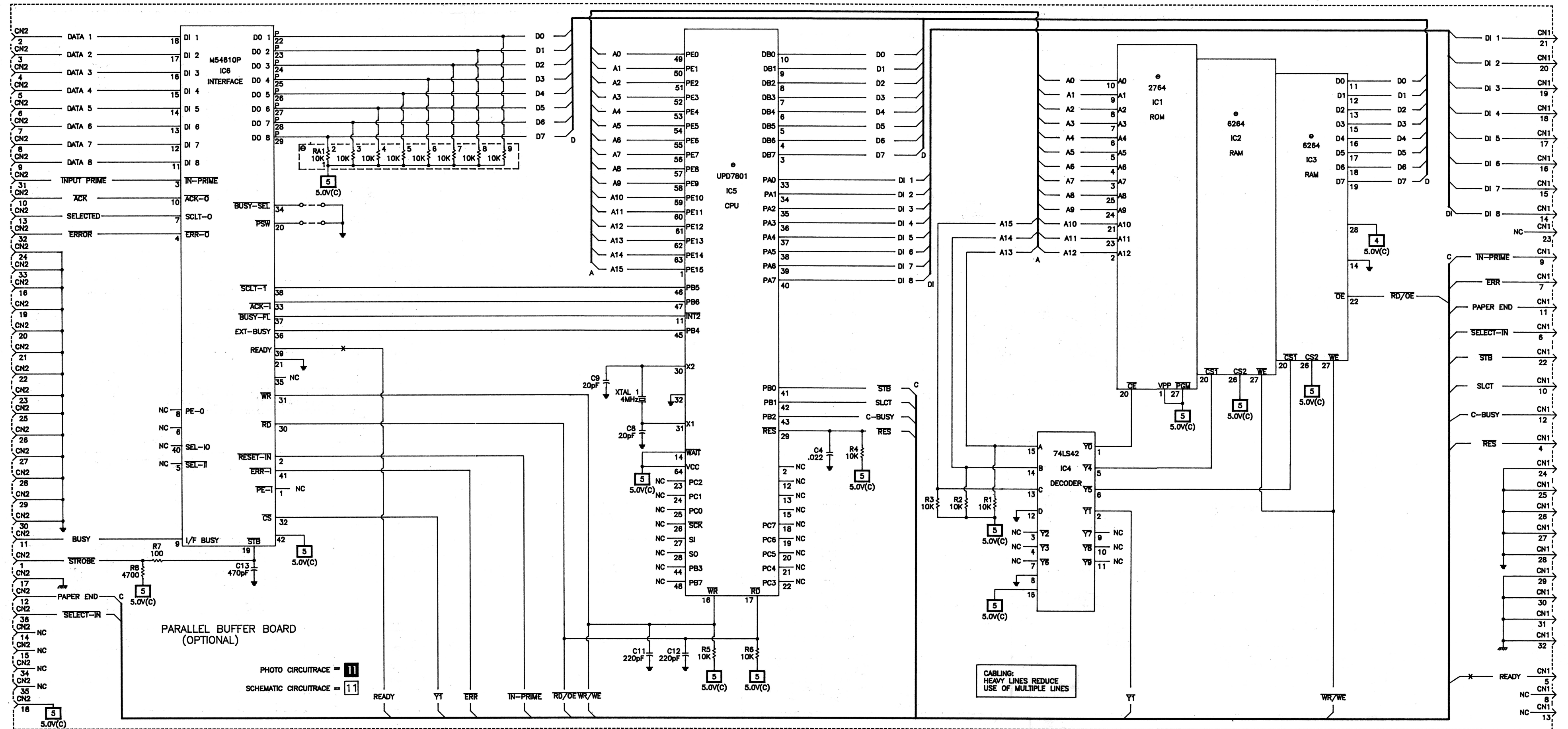
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WITH **CircuitTrace**

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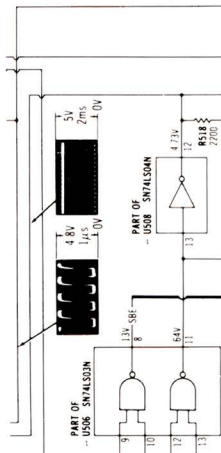
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Remove staples and use cover for file folder.

- Quick Component Location using the SAMS exclusive GRIDTRACE, CIRCUITRACE, and component photographs.

	4	5	6	7	8	9	10	11	12	
										

- Preliminary Service Checks section is an easy to use, step by step guide for the experienced technician or hobbyist, and even beginners.
- SAMS famous industry accepted standardized notation schematics containing CIRCUITTRACE[®], GRIDTRACE[™], waveforms, voltages and stage identification.

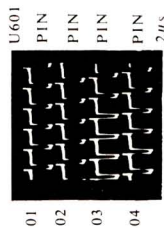


- **Step by Step Troubleshooting** guides the technician through the necessary procedures to quickly locate the problem.

SEMICONDUCTORS (Select replacement for best results)

ITEM No.	TYPE No.	MFGR. Part No.	REPLACEMENT DATA					NOTES
			ECG Part No.	NTE Part No.	RCA Part No.	/ZENITH Part No.		
D102	1S553	1149-2576	ECG519	NTE519	SK9091/177	103-131		
D103	2N60FM	1149-2527	ECG109	NTE109	SK3088	103-Z9001		
D201	1N4004GP	1201-4205	ECG116	NTE116	SK3312	212-76-02		
D501 thru D503	1S553	1149-2576	ECG519	NTE519	SK9091/177	103-131		

Verify the processor is functioning by checking the signals on the address lines (pins 10 thru 24 of IC U600) and the data lines (pins 41 thru 56) using a logic probe or a scope if a logic probe is used, refer to the "Logic Chart" for the correct readings. If a scope is used, the waveforms on the address lines (except pins 22 and 23 which have no signal in Power Up mode) should be similar to Figure 1. The waveforms on the data lines should be similar to Figure 2.



- Logic Chart containing logic probe readings to isolate defective circuitry and components.

LOGIC

PIN NO	IC U100	PIN NO	IC U100	PIN NO	IC U102	IC U103	IC U104	IC U105	IC U106	IC U107	IC U108	IC U109
1	P	21	P	1	1	1	1	1	1	1	1	1
2	P	22	P	2	1	1	P	P	P	P	P	P
3	P	23	P	3	H	H	H	H	H	H	H	H

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